



**JERROLD**

a GENERAL INSTRUMENT company

Installation and Operating Instructions

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## COMMANDER III CATV HEAD-END SYSTEM

### INTRODUCTION

Jerrold Commander III Head-End System equipment is the realization of an integrated CATV head-end design which saves space, time, and initial investment as well as future outlays when expansion becomes necessary.

The concept of interchangeable modules, and modules common to both TV signal processing and video modulating configurations within the same main frame, greatly facilitates planning, installing, operating, and maintaining a head-end with the utmost economy.

Integrated circuitry provides high reliability in performance of frequency and temperature-sensitive networks. A built-in group delay equalizer tightly controls envelope delay from edge to edge of the video information passband. This ensures minimum chroma delay and optimum transient performance, resulting in sharp and crisp pictures. This feature becomes all the more important where multiple processing (Hub) systems covering widely separated distribution areas have to ensure satisfactory viewing by subscribers at all the extremities of the system.

In addition, an optional type of the Commander III equipment, Model CHPPD and CMMP, can be ordered factory-equipped with phase-locked output conversion modules and/or with automatic signal replacer and automatic IF switching modules (for program control); or these modules can be installed in the field at a later date when system expansion requires it.

All these facilities permit designing a head-end which will suit any individual system requirements and configurations for up to 35 channels and in strict compliance with FCC standards and regulations.

The equipment is designed for 19" standard rack or cabinet mounting, requiring a mere 3-1/2 inches of vertical rack space per unit. The necessary mounting hardware as well as essential intercables and an extremely well-matched adapter for the  $75\ \Omega$  test terminals are shipped with each Commander III unit.

Before installation and operational set-up is attempted, the user should acquaint himself with the information presented in the following tables:

Table 1.... Modular Composition of Commander III Equipment

Table 2.... Specifications for the Commander III Processor

Table 3.... Specifications for the Commander III Modulator

Tables 4, 5, 6... Antenna Signal Level Considerations

Table 7.... Control and Connector Functions of Processor

Table 8.... Control, Connector, and Metering Functions of Modulator.

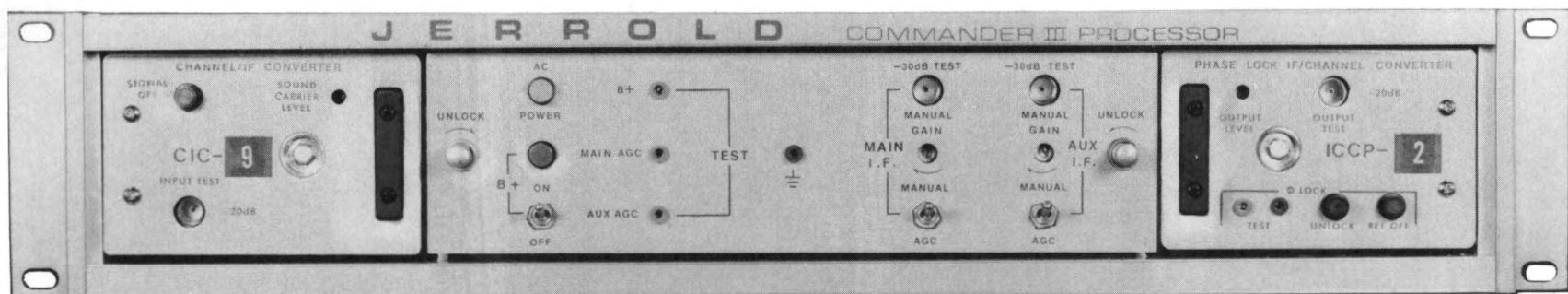


Fig. 1 PROCESSOR EQUIPPED FOR VHF OFF-CHANNEL AND PHASELOCK OPERATION

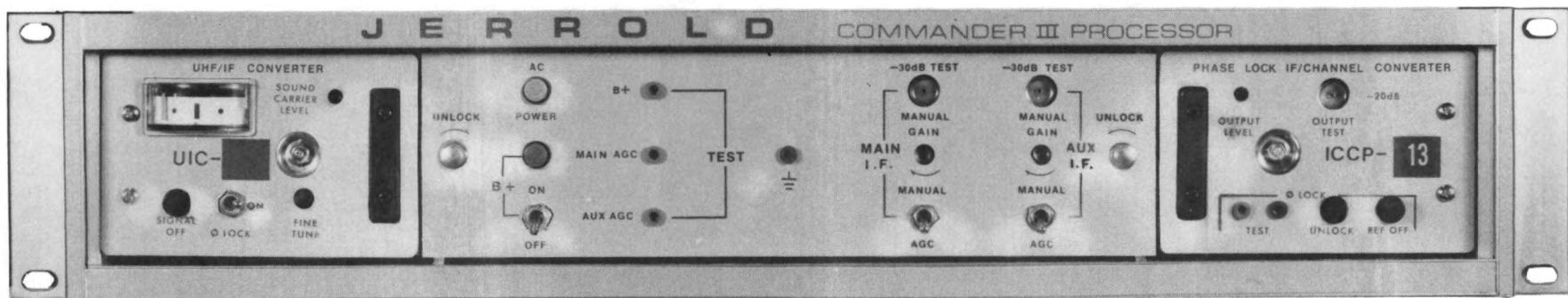


Fig. 2 PROCESSOR EQUIPPED FOR UHF OFF-CHANNEL AND PHASELOCK OPERATION



Fig. 3 MODULATOR EQUIPPED FOR PHASELOCK OPERATION

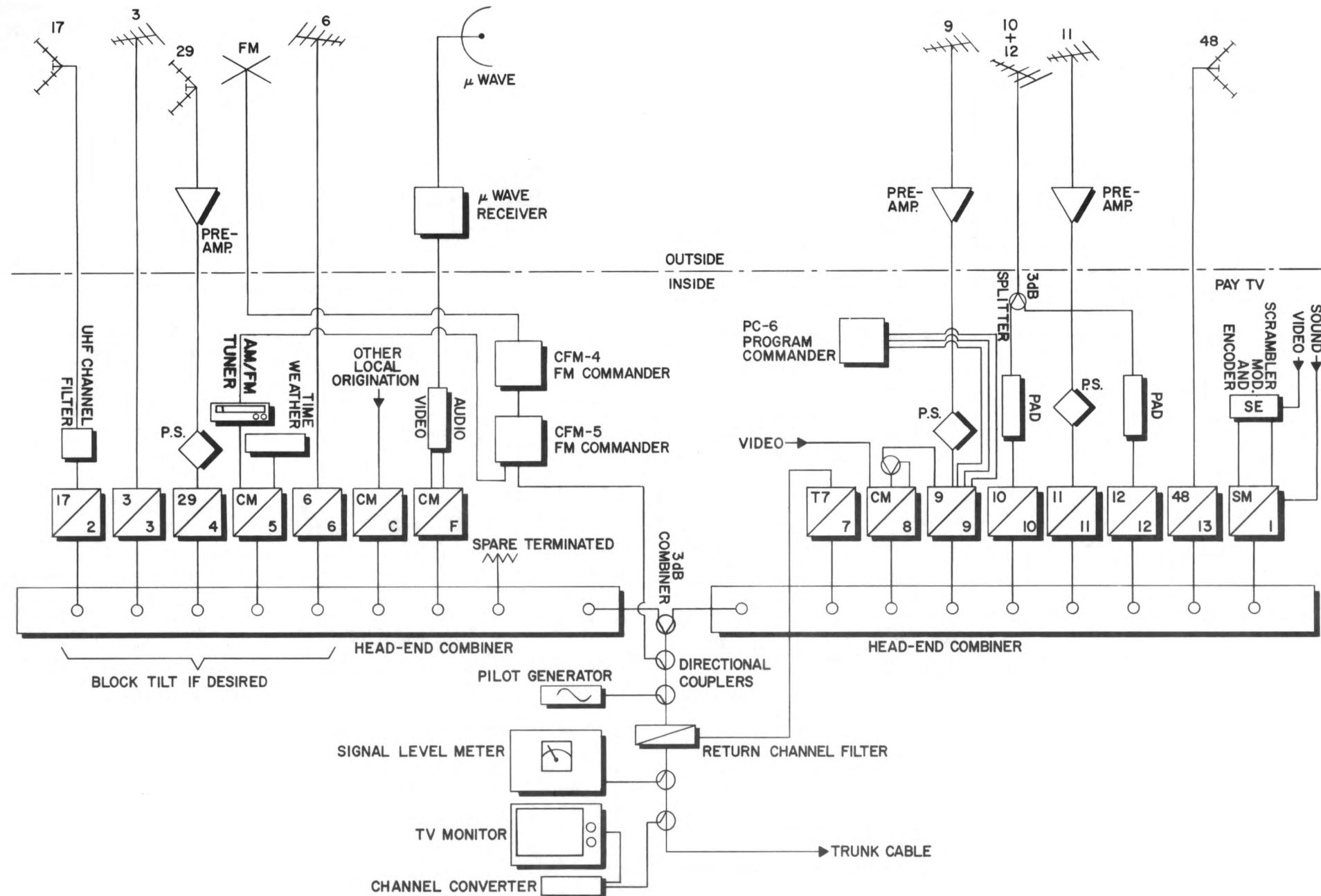


Fig. 4 TYPICAL HEAD-END CONFIGURATION

**TABLE 1 MODULAR COMPOSITION OF COMMANDER III EQUIPMENT**

Module Designation	Description	Processors		Modulators	
		CHPD	CHPPD	CMM	CMMP
PMF	Processor Main Frame	X	X	—	—
MMF	Modulator Main Frame	—	—	X	X
CPR	Power Supply Module	X	X	X	X
IFF	IF Filter	X	X	—	—
CIC or UIC	Channel (VHF or UHF) to IF Converter	X	X	—	—
CIA	IF Amplifier and AGC Module	X	X	—	—
CAX	Auxiliary AGC Module	X	X	X	X
ICC	IF-to-Channel Converter	X	—	X	—
ICCP	IF-to-Channel Converter with Phaselock	—	X	—	X
CVM	Video Modulator	—	—	X	X
CAM	Audio Modulator	—	—	X	X
CVF	Vestigial Sideband Filter	—	—	X	X
PLB	Phaselock Module	—	X	—	X
CDL	Delay Equalizer Module	X	X	—	—
CSR (option)	Signal Replacer Module	X	X	X	X
CIS (option)	IF Switching Module	X	X	X	X

**TABLE 2 SPECIFICATIONS—COMMANDER III PROCESSOR, MODEL CHPD**

Input Channels	T7 thru T11, 2 thru 13, A thru W, and 14 thru 83.
Output Channels	T7 thru T11, 2 thru 13 and A thru W.
RF Input and Output Terminal Impedance	75 ohms.
RF Input and Output Terminal Match	16 dB minimum return loss.
Input Level Range, any channel	—20 to +30 dBmV.
Output Level Range, any channel	10 dB, continuously adjustable from 50 to 60 dBmV.
Frequency Tolerance (total conversion tolerance)	±14 kHz, from 32° to 120°F.
Noise Figure, at full gain	5 dB or better for sub and lo-band channels, 6 dB or better for mid, high and super band channels, 9 dB or better for UHF channels.
Carrier-to-Noise Ratio at +10 dBmV in	60 dB or better at VHF, 57 dB or better at UHF.
Sound Limiting	10 dB or better at —25 dBmV in.
Sound Carrier Level, adjustable	—5 to —25 dB relative to video output carrier.
IF Video Carrier	45.75 MHz.
IF Sound Carrier	41.25 MHz.
AGC Accuracy	±0.5 dB maximum at +60 dBmV out, for input changes from —20 to +30 dBmV.
AGC Response Speed for 6-dB step input change	5 ms attack and release.
Response Flatness	+0.5 to —1.0dB from —0.75 to +4.18 MHz relative to video carrier.
Adjacent Channel Rejection	60 dB or better.
Intermodulation (Overload) at input	—80 dB or better for adjacent channels, each at 10 dBmV.
Cross-Modulation at input	—80 dB or better with any number of other channels, each at +10 dBmV. —70 dB or better with any number of other channels, each at +20 dBmV.
Image Rejection	60 dB or better.
Spurious Output	—70 dB or better at 60 dBmV out, 5 to 350 MHz.
Recommended Output Level	+60 dBmV maximum.
IF Output Level	+30 dBmV.
IF Input Level Range	+23 to +37 dBmV, for ±0.5 dB RF output change.
Group Delay	±25 ns video thru color subcarrier +75 to —25 ns, from video carrier to —0.75 MHz.

**TABLE 3 SPECIFICATIONS—COMMANDER III MODULATOR, MODEL CMM**

Output Channels	T7 thru T11, 2 thru 13, and A thru W.
RF Output Terminal Impedance	75 ohms.
RF Output Terminal Match	16 dB minimum return loss.
Recommended Output Level	+60 dBmV, maximum.
Output Level Range	10 dB, continuously adjustable from 50 to 60 dBmV.
Spurious Output	-70 dB or better at 60 dBmV out, 5-350 MHz.
Frequency Tolerance	$\pm 14$ kHz, from 32° to 120°F.
Sound Carrier Level	adjustable from -5 to -25 dB, relative to video output carrier level.
IF Video Carrier	45.75 MHz.
IF Sound Carrier	41.25 MHz.
IF Output Level	+30 dBmV.
IF Input Level Range	+23 to +37 dBmV, for $\pm 0.5$ dB RF output change.
Overall Group Delay	conforms to FCC requirements for color broadcast, Pt./para. 73.687.
Video Input Level	0.5 V p-p minimum for 87.5% modulation.
Video Input Type	composite, NTSC standard, negative sync.
Video Input Impedance	75 ohms.
Video Input Match	30 dB min. return loss, 25 Hz to 6 MHz.
Overall Amplitude Response	$\pm 1$ dB or better, 25 Hz to 4.18 MHz.
Differential Gain	0.5 dB max., for 87.5% depth of modulation, 10% to 90% average picture level.
Differential Phase	1° max. for 87.5% depth of modulation, 10% to 90% average picture level.
AM Hum and Noise	-60 dB or better, relative to 87.5% depth of modulation.
Sync Compression	0.4 dB max., for 87.5% depth of modulation.
Tilt or Sag of 60 Hz Square Wave	1% maximum.
Modulation Range	to 95%.
White Level Limit	adjustable from 80% to 95% depth of modulation.
Audio Input Type	600 ohms balanced; Cannon jack type XLR.
Audio Input Level	continuously adjustable, 50 mV rms (-24 dBm) min. for $\pm 25$ kHz deviation, at 1 kHz or lower.
Audio Frequency Response	$\pm 1$ dB or better, 50 Hz to 15 kHz, including standard pre-emphasis.
Harmonic Distortion	1% max., at $\pm 25$ kHz deviation, 50 Hz to 15 kHz.
FM Hum and Noise	-60 dB or better, relative to $\pm 25$ kHz deviation.
Inter-Carrier Frequency	4.5 MHz $\pm 1$ kHz.
Aural Subcarrier Frequency	4.5 MHz.
Aural Subcarrier Input Impedance	75 ohms, unbalanced.
Aural Subcarrier Input Match	15 dB minimum return loss.
Aural Subcarrier Input Level Requirement	3.16 mV rms (10 dBmV) minimum.
Metering: 1. Video Modulation	indicates peak percent depth of modulation, within $\pm 3\%$ , for any composite video waveform.
2. Audio Modulation	indicates deviation in kHz, within $\pm 5\%$ up to 35 kHz deviation.
3. AGC Voltage	indicates operating point in DC volts within $\pm 3\%$ , of AUX IF AGC system.
4. B+	indicates regulated supply DC voltage, $\pm 3\%$ max.
5. Ø Lock	indicates output phaselock correction DC voltage, $\pm 3\%$ .

**TABLE 3a GENERAL SPECIFICATIONS COMMON TO MODELS CHPD AND CMM**

Operating Temperature Range	32° to 120°F.
AC Power Requirements	100 to 130 volts, 50 or 60 Hz, 25 watts.
Internal, Regulated Supply Voltage	20 V DC.
DC Standby Power Requirements	23 to 30 V, 900 mA maximum.
Mounting	19-inch standard relay rack or cabinet.
Overall Dimensions	19-inch front panel, 3.5 inches high, 17 inches deep.
Shipping Weight	21 lbs.

**TABLE 3b SPECIFICATIONS FOR PHASELOCK PARAMETERS IN MODELS CHPPD AND CMM**

Phaselock Capabilities	a. single channel, b. incremental, or c. harmonic
Reference Signal Level	+10 to +30 dBmV (CW); +20 to +30 dBmV (modulated carrier).
Capture Range	$\pm 40$ kHz.

**TABLE 3c SPECIFICATIONS—SIGNAL REPLACER MODULE CSR (OPTIONAL)**

Standby Carrier Modes  (relevant to -15 dB sound carrier)	a. CW,
	b. external video —1 V p-p for 87.5% modulation.
	c. external 4.5 MHz sound, at 150 mV rms min.
Carrier Output Level	0 to -10 dB relative to normal video level.
Carrier Delay (Turn-On)	0, or 5, or 25 seconds—switchable.

**INPUT SIGNAL REQUIREMENTS FOR PROCESSORS**

1. For the proper operation of the Commander III Processor it is assumed the associated antenna has been designed for :
  - a) highest gain, by stacking and - if needed - by using a preamplifier, where the off-air signal is weak;
  - b) optimum phasing and spacing, to minimize the effect of interfering signals.
2. The Processor recommended input signal level is +10 dBmV. This level will yield a C/N (carrier-to-noise) ratio of 60 dB minimum for VHF channels and 57 dB minimum for UHF channels, with the video carrier centered near the mid-range of the AGC capability of the Processor. This establishes a margin of 20 dB for up-swings and 30 dB for down-swings (fading) of the input signal level; see specifications Table 2. Higher input levels will reduce the margin for up-swings with very little improvement in the C/N ratio, while lower input levels will reduce the C/N ratio.
3. To prevent especially the latter condition, it is important to have a record of the signal level swings over a reasonable period at the antenna output terminals, and to know the attenuation the particular channel will suffer in the antenna coaxial download. A simple calculation will determine whether or not a single-channel, mast-mounted preamplifier should be used. It must be remembered that the signal-to-noise ratio at the antenna terminals will be degraded by the noise figure of electronic devices in the rest of the system.
4. In no case should the input signal level to the Processor be allowed to fall below -20 dBmV or to rise above +30 dBmV. If the combination of antenna gain, preamplifier gain, and cable loss exceeds the desired input level of +10 dBmV, an optional in-line pad of the PDA-\* series should be used at the Processor RF input terminal.
5. The Processor is designed for handling any number of interfering signals at levels as high as that of the desired signal, without the use of an external filter for the channel to be processed or traps for interfering adjacent channels. However, where such interfering signals are present at levels higher than that of the desired signal, the use of optional bandpass filter Models PBF-\* , and of trap Models TLB, THB, or TFM, makes possible to keep the interfering signal levels below that of the desired one under worst fading conditions.
6. There may be some geographical areas where long-term, pronounced up-swings from normal signal levels may occur. In such cases it may be advisable to operate the Processor at a somewhat lower input level and accept a slight trade-off in the optimum C/N ratio while the AGC circuitry will still properly handle the signal level variations.
7. To enable the head-end designer to quickly relate antenna signal level conditions to the requirements of properly driving the Commander III Processor, three tables are given here; the tables are self-explanatory.

**TABLE 4 TYPICAL LEVEL SWINGS AS A FUNCTION OF ANTENNA SIGNAL LEVELS**

Average Antenna Signal Level	Typical Level Swings	Min. / Max.
-15 dBmV	±15 dB	-30 dBmV / 0 dBmV
-5 dBmV	±10 dB	-15 dBmV / +5 dBmV
+5 dBmV	±5 dB	0 dBmV / +10 dBmV
+10 dBmV	±2 dB	+8 dBmV / +12 dBmV
above +10 dBmV	negligible	

**TABLE 5 DETERMINATION OF REQUIREMENT FOR A VHF PREAMPLIFIER WITH A TYPICAL GAIN OF 20 dB AND A TYPICAL NOISE FIGURE OF 5 dB**

Antenna Signal dBmV	Preamplifier C/N Ratio dB	Preamplifier Output dBmV	Average Download Loss, dB*	Comdr. III Input Level dBmV	Comdr. III C/N Ratio dB	Head-End C/N Ratio dB	Commander III without Preamplifier		Comment	
							Input, dBmV	C/N, dB		
-20	34	0	4.5	-4.5	50	34	-24.5	—	Needs Preamplifier with 20+ dB gain	
-30	24	-10	4.5	-14.5	40.5	24	-34.5	—		
-15	39	+5	4.5	+0.5	55	39	-19.5	—	Preamplifier Needed	
0	54	+20	4.5	+15.5	66	53.5	-4.5	—		
-15	39	+5	3.5	0**	54.5	39	-18.5	36	Preamplifier Needed	
-5	49	+15	3.5	+10**	63.5	49	-8.5	46		
0	59	+25	3.5	+20**	68	58.5	-3.5	51		
0	54	+20	2.5	+5**	59	52.5	-2.5	52	Preamplifier Optional	
+5	59	+25	2.5	+10**	63.5	57.5	+2.5	57		
+10	64	+30	2.5	+15**	66	62	+7.5	61		
+10	64	+30	1.0	100'	+10**	63.5	61	+9	62	No Preamplifier
+20	74	+40	1.0	+10**	63.5	63	+10**	63.5	No Preamplifier	

Notes: \*The average download losses are based on the use of polystyrene dielectric type, aluminum-sheathed, coaxial cable with an outer sheath diameter of 0.5 inches, and measured for 100 feet of such cable at channel 13.

\*\*Levels are padded down to the desired +10 dBmV input.

**TABLE 6 DETERMINATION OF REQUIREMENT FOR A UHF PREAMPLIFIER WITH A TYPICAL GAIN OF 22 dB AND A TYPICAL NOISE FIGURE OF 6 dB**

Antenna Signal dBmV	Preamplifier C/N Ratio dB	Preamplifier Output dBmV	Average Download Loss, dB*	Comdr. III Input Level dBmV	Comdr. III C/N Ratio dB	Head-End C/N Ratio dB	Commander III without Preamplifier		Comment
							Input, dBmV	C/N, dB	
-20	33	+2	8	-6	45	33	-28	—	Needs Preamplifier with 22+ dB gain
-30	23	-8	8	-16	35	23	-38	—	
-15	38	+7	8	-1	50	38	-23	—	Preamplifier Needed
0	53	+22	8	+14	60.5	52	-8	—	
-15	38	+7	6	+1	52	38	-21	30	Preamplifier Needed
-5	48	+17	6	+11	59	47.5	-11	40	
+5	58	+27	6	+21	64	57	-1	50	
0	53	+22	4	+5**	55	51	-4	47	Preamplifier Optional
+5	58	+27	4	+10**	59	55.5	+1	52	
+10	63	+32	4	+15**	61	59	+6	56	
+10	63	+32	2	100'	+10**	59	57.5	57.5	No Preamplifier
+20	73	+42	2	+10**	59	59	+10**	59	No Preamplifier

Notes: \*The average download losses are based on the use of polystyrene dielectric type, aluminum-sheathed, coaxial cable with an outer sheath diameter of 0.5 inches, and measured for 100 feet of such cable at 890 MHz.

\*\*Levels are padded down to the desired +10 dBmV input.

**TABLE 7 CONTROL AND CONNECTOR FUNCTIONS OF COMMANDER III PROCESSOR**

Module	Designation	Description and Schematic Reference	Position	Function
Front Panel	Signal Off	Light-Emitting Diode, CR551	lit	Indicates absence of signal at converter input.
	Input Test, -20 dB	Test Jack, TP501	—	Permits connection of signal level meter for measuring input signal level.
	Sound Carrier Level	Potentiometer, R575	↙ max.	Permits adjustment of sound carrier output level.
Inside, Right Rear	Local Oscillator	Slide Switch, S551, factory-set	Ext.	On-Channel operating position.
			Int.	Off-Channel operating position.
UIC*	Signal Off	Light-Emitting Diode, CR775	lit	Indicates absence of signal at converter input.
	(Meter)	Phaselock Meter, M775	—	Indicates phaselock offset or sweeping phaselock, with the $\phi$ Lock switch in the ON position.
	Fine Tune	Potentiometer, R708	—	Permits adjustment of phaselock offset, with $\phi$ Lock switch in ON position.
	$\phi$ Lock	Toggle Switch, S775	ON (off)	Activates phaselock circuit to maintain video output frequency exactly at 45.75 MHz. Deactivates phaselock circuitry.
	Sound Carrier Level	Potentiometer, R710	↙ max.	Permits adjustment of sound carrier input level.
Center Drawer, Front Panel	AC Power	Pilot Lamp, L1	lit	Indicates unit energized from AC line.
	B+	Pilot Lamp, L2	lit	Indicates B+ supply is ON with B+ switch in ON position.
	B+	Toggle Switch, S2	ON	Activates B+ supply.
	TEST B+	Tip Jack, TP3	—	Permits connection of DC voltmeter for measuring B+ voltage.
	Main AGC	Tip Jack, TP4	—	Permits connection of DC voltmeter for measuring Main AGC voltage.
	Aux. AGC	Tip Jack, TP5	—	Permits connection of DC voltmeter for measuring Auxiliary AGC voltage.
	$\underline{\underline{L}}$ or Common	Tip Jack, TP6	—	Ground (negative probe) connection for metering instrument.
	Main I.F.	-30 dB Test, TP2, 75 $\Omega$ Fitting	—	Permits connection of signal level meter through test probe PMG-61-F for measuring Main I.F. output level.
		Manual Gain, Potentiometer, R1	↙ max.	Permits adjustment of gain of Main I.F. amplifier, with switch S3 in Manual position.
		Toggle Switch, S3	Manual AGC	For Manual Gain control adjustment by R357. Main I.F. amplifier operates under AGC.
	Aux. I.F.	-30 dB Test, TP1, 75 $\Omega$ Fitting	—	Permits connection of signal level meter through test probe PMG-61-F for measuring Auxiliary I.F. output level.
		Manual Gain, Potentiometer, R237	↙ max.	Permits adjustment of gain of Auxiliary I.F. amplifier, with switch S1 in Manual position.
		Toggle Switch, S1	Manual AGC	For Manual Gain control adjustment by R237. Auxiliary I.F. amplifier operates under AGC.
Center Drawer Top Cover	Main AGC I.F. Level	Potentiometer, R357	↙ max.	Permits adjustment of Main AGC I.F. level.
Center Drawer, Bottom Cover	Signal Replacer, I.F. Level	Potentiometer, R208	max. ↘	For setting CSR module I.F. level.
	Aux. AGC I.F. Level	Potentiometer, R237	↙ max.	For setting aux. AGC output level to ICC-* module.
	Signal Replacer, Modulation	Potentiometer, R205	↙ max.	For setting depth of modulation on CSR module.
	Standby Delay	Plug, P202 (factory-set to Short)	Instant	Activates I.F. switch or CSR module, where present (as set by P201) within: 0 to 1 second nominal.
			Short	5 seconds nominal.
			Long	25 seconds nominal.
	Aux. Input	Plug, P201	I.F.	External I.F. source connected.
			Video	External video to CSR connected.

**TABLE 7 CONTROL AND CONNECTOR FUNCTIONS OF COMMANDER III PROCESSOR (cont.)**

Module	Designation	Description and Schematic Reference	Position	Function
ICC-* Front Panel	Output Test, -20 dB	TP401, 75 Ω Fitting	—	Permits connection of signal level meter through test probe PMG-61-F for measuring level of output channel.
	Output Level	Potentiometer, R401	↙ max.	Permits adjustment of output channel level.
ICCP-* (Option) Front Panel	Output Test, -20 dB	TP401, 75 Ω Fitting	—	Same as for ICC-* module.
	Output Level	Potentiometer, R401	↙ max.	
	Ø Lock, Test	Tip Jack, TP451 Tip Jack, TP452	Test, red black	Permits connection of DC voltmeter for measuring Ø Lock voltage (red: positive).
	Unlock	Light-Emitting Diode, CR452	blinking	Output not phaselocked, searching.
	Ref. Off	Light-Emitting Diode, CR453	lit	Phaselock reference signal absent.
Processor, Rear Panel	R.F. In	75 Ω Connector, J2	—	R.F. input terminal.
	L.O. Out/Phaselock Ref. In	75 Ω Connector, J3	—	Local Oscillator output terminal for on-channel operation, or Phaselock Reference Signal input terminal.
	L.O. In	75 Ω Connector, J4	—	Local Oscillator input terminal for on-channel operation.
	I.F. Out	75 Ω Connector, J6	—	I.F. Amplifier output terminal.
	I.F. In, Normal	75 Ω Connector, J7	—	I.F. Amplifier input terminal.
	Program	75 Ω Connector, J8	—	I.F. Input terminal when optional CIS module is used for I.F. switching.
	Aux. Standby Mod. In	75 Ω Connector, J9	—	I.F. Input terminal when Aux. Standby Mod. is used, or for Emergency Alert input.
	R.F. Out	75 Ω Connector, J10	—	Output terminal of designated output channel, for jumpering to head-end output combiner.
	½-Amp. Fuse	Fuse, F1	—	For normal 115-V, 60-Hz line fuse.
	2-Amp. Fuse	Fuse, F2	—	Fuse for standby power input.
	(Terminal Block)	9-Terminal Block, TB1	1	Chassis ground and common for other terminals; connect to pin #2 on PC-6 when CIS is used.
			2	B+ connection for auxiliary use of +20 V d.c. output from regulated power supply; 50 mA or more of current available, depending upon module configuration.
			3	Connect to pin #2 to inhibit CSR.
			4	Override control, allows instant activation of CSR module or Aux. I.F. input by jumpering to ground terminal 1; deactivate by removing jumper (return of 5 to 20 V d.c. potential).
			5	Makes available a "Signal Off" control voltage of +17 to +20 V d.c. during normal operation, 0 to 0.3 V d.c. in standby or override mode; may be used for activating external relay or indicator, or may be connected to terminal 9 of another Processor or Modulator for external control of standby system.
			6	Permits application of 23 to 30 V d.c. from external standby power supply.
			7 and 8	Normal I.F. for connection to pin #1 and Program I.F. for connection to pin #3 of Program Commander PC-6 when optional CIS module is used.
			9	For external standby system control of another Processor or Modulator (see 5).

**TABLE 8 CONTROL, CONNECTOR, AND METERING FUNCTIONS OF COMMANDER III MODULATOR**

Module	Designation	Description and Schematic Reference	Position	Function
CAM Front Panel	Sound Deviation	Potentiometer, R505	↙ max.	Permits adjustment of sound carrier deviation.
	Deviation Test	Tip Jacks, TP553, TP554	—	Permits connection of VTVM for testing sound carrier deviation (red: positive).
	Sound Carrier Level	Potentiometer, R529	↙ max.	Permits adjustment of sound carrier level.
	Video Mod.	Potentiometer, R558	↙ max.	Permits adjustment of depth of video modulation.
	Signal Off	Light-Emitting Diode, CR513	lit	Indicates absence of signal at module input.
Inside, Right Rear	Input, Audio, —4.5 MHz	Slide Switch, S501	Audio	Accepts 600 Ω impedance audio input (factory-set switch position).
			4.5 MHz	Accepts a 4.5 MHz aural carrier input.
Center Drawer, Front Panel	AC Power	Pilot Lamp, L1	lit	Indicates unit energized from AC line.
	B+	Pilot Lamp, L2	lit	Indicates B+ supply is ON with B+ switch in ON position.
	B+	Toggle Switch, S2	ON	Activates B+ supply.
	Meter Function	Rotary Switch, S4	∅ Lock	Meter indicates phaselock correction voltage on ∅ Lock scale.
			B+	Meter indicates B+ voltage on B+ scale.
			AGC	Meter indicates AGC voltage on AGC scale.
			Video Mod	Meter indicates depth of video modulation on % modulation scale.
			Audio Mod	Meter indicates sound carrier deviation on kHz Dev. scale.
	I.F.	75 Ω Fitting, TP1	—30 dB Test	Permits connection of signal level meter for measuring Aux. I.F. level.
		Manual Gain, Potentiometer, R357	↙ max.	Permits adjustment of gain of I.F. amplifier, with switch S1 in Manual position.
		Toggle Switch, S1	Manual	For Manual Gain control adjustment by R357.
			AGC	I.F. amplifier operates under AGC.
Center Drawer, Top Cover	I.F. Level	Potentiometer, R330	↙ max.	For setting I.F. output level; not needed during operational set-up.
Center Drawer, Bottom Cover	Signal Replacer, I.F. Level	Potentiometer, R208	max. ↘	For setting CSR module I.F. level.
	Aux. AGC I.F. Level	Potentiometer, R237	↙ max.	For setting Aux. AGC output level to ICC-* module.
	Signal Replacer, Modulation	Potentiometer, R205	↙ max.	For setting depth of modulation on CSR module.
	Standby Delay	Plug, P202 (factory-set to Short)	Instant	Activates I.F. switch or CSR module, where present (as set by P201) within: 0 to 1 second nominal.
			Short	5 seconds nominal.
			Long	25 seconds nominal.
	Aux. Input	Plug, P201	I.F.	External I.F. source connected.
			Video	External video to CSR connected.
ICC-* Front Panel	Output Test, —20 dB	75 Ω Fitting, TP401	—	Permits connection of signal level meter for measuring output level.
		Potentiometer, R401	↙ max.	Permits adjustment of output channel video carrier level.
ICCP-* (Option) Front Panel	Output Test, —20 dB	75 Ω Fitting, TP401	—	Same as for ICC-* module.
	Output Level	Potentiometer, R401	↙ max.	
	∅ Lock, Test	Tip Jack, TP451 Tip Jack, TP452	Test, red black	Permits connection of DC voltmeter for measuring ∅ Lock voltage (red: positive).
	Unlock	Light-Emitting Diode, CR452	blinking	Output not phaselocked, searching.
	Ref. Off	Light-Emitting Diode, CR453	lit	Phaselock reference signal absent.

**TABLE 8 CONTROL, CONNECTOR, AND METERING FUNCTIONS OF COMMANDER III MODULATOR (cont.)**

Module	Designation	Description and Schematic Reference	Position	Function
Rear Panel	Audio In	3-Wire Jack, J1	—	600 Ω balanced audio input jack.
	Video In	75 Ω Connector, J2	—	Video input terminal.
	Phaselock Ref. In	75 Ω Connector, J3	—	Phaselock reference signal input terminal.
	4.5 MHz In	75 Ω Connector, J4	—	4.5 MHz aural carrier input terminal, with switch S501 in 4.5 MHz position.
	I.F. Out	75 Ω Connector, J6	—	I.F. Amplifier output terminal.
	I.F. In, Normal	75 Ω Connector, J7	—	I.F. Amplifier input terminal.
	Program	75 Ω Connector, J8	—	I.F. Input terminal when optional CIS module is used for I.F. switching.
	Aux. Standby Mod. In	75 Ω Connector, J9	—	I.F. Input terminal or for video input to CSR.
	R.F. Out	75 Ω Connector, J10	—	Output terminal of designated output channel, for jumpering to head-end output combiner.
	½-Amp. Fuse	Fuse, F1	—	For normal 115-V, 60-Hz line fuse.
	2-Amp. Fuse	Fuse, F2	—	Fuse for standby power input.
(Terminal Block)	9-Terminal Block, TB1		1	Ground (chassis) and common for other screw terminals.
			2	B+ connection for auxiliary use of +20 V d.c. output from regulated power supply; 50 mA or more of current available, depending upon module configuration.
			3	Connect to pin #2 to inhibit CSR.
			4	Override control, allows instant activation of CSR module or Aux. I.F. input by jumpering to ground terminal 1; deactivate by removing jumper (return of 5 to 20 V d.c. potential).
			5	Makes available a "Signal Off" control voltage of +17 to +20 V d.c. during normal operation, 0 to 0.3 V d.c. in standby or override mode; may be used for activating external relay or indicator, or may be connected to terminal 9 of another Processor or Modulator for external control of standby system.
			6	Permits application of 23 to 30 V d.c. from external standby power supply.
			7 and 8	Normal I.F. for connection to pin #1 and Program I.F. for connection to pin #3 of Program Commander PC-6 when optional CIS module is used.
			9	For external standby system control of another Processor or Modulator (see 5).

## COMMANDER III PROCESSOR

### INSTALLATION

#### 1. BENCH INSTALLATION OF OPTIONAL MODULES

##### 1.1 Installing Model CSR

1.1.1 Unlock the pawl fasteners on the center drawer of the Processor, pull out the drawer from the Main Frame and tilt the drawer up to the vertical position until it locks into place.

1.1.2 Remove the bottom cover from the drawer by removing the holding screws; the CAX module circuit board is now accessible for insertion of the CSR module. For easy insertion, first remove jack No.35 from its pins on the CAX board, then plug the CSR straight into the CAX board as illustrated in Fig. 7. Return jack No. 35 to its former position. Refer to the bottom coversilk screen and set switch plugs P201 and P202 as required by system design. Replace the cover.

1.1.3 To return the center drawer to the cage, first press the two spring-loaded latches together and let the drawer drop to the horizontal position; then push the drawer back into the cage and lock it.

##### 1.2 Installing Model CIS

1.2.1 Model CIS comes factory-equipped with six hook-up wires and three coaxial cables with appropriate connectors as shown in Fig. 8 (module upside-down showing the two built-in mounting nuts).

1.2.2 To gain access to the rear compartment of the Processor cage, where the CIS is to be installed, first remove the six screws holding the top cover of the Processor, then slide the cover out toward the rear panel.

1.2.3 Stand the Processor on its side and install the CIS module, cover down - so that the mounting nuts of the CIS will register with the associated holes in the bottom of the Processor chassis; then secure the CIS with the two mounting screws, shipped with the CIS, from the bottom of the Processor chassis; see Fig. 9.

1.2.4 Set the Processor back to normal position on the bench. Remove connector J7 from its aperture "IF IN NORMAL" in the Processor rear panel and in its stead install connector J1, cable #21, from the CIS module, using the nut from J7.

1.2.5 Connect P1 from the CIS to J7.

1.2.6 Remove connector J8 from the "IF IN PROGRAM" aperture of the rear panel and in its stead install connector J2, cable #20, from the CIS module, using the nut from J8.

1.2.7 Solder the six hook-up wires of the CIS to the rear terminals of terminal block TB1 as follows:

Black	to	TB1-1	GND
White	to	TB1-2	+20 VDC
Brown	to	TB1-3	IF PROGRAM
Violet	to	TB1-7	NORMAL IF
Green	to	TB1-8	PROGRAM IF
Yellow	to	TB1-9	PROGRAM STBY

1.2.8 Dress the hook-up wires and coaxial cables along the existing harness and secure them with plastic fasteners such as tie wraps; then replace the cover on the chassis.

## 2. MOUNTING

2.1 Commander III Processors can be mounted on racks or in cabinets. For optimum air circulation it is recommended that the units be mounted in groups of three, with the groups separated by output combiners such as Jerrold Model HC-\*, or by blank panels of at least 3-1/2 inches in height. Each Processor should be mounted with the four screws supplied in the accessory package, to ensure a sturdy mount.

## 3. INPUT CONNECTIONS (assuming filters, traps, etc. are installed where needed).

3.1 The Processor requires a 75 ohm coaxial input at the RF IN terminal, preferably double shielded cable such as RG-6A/U equipped with an appropriate connector such as Model F-56. It is advisable to attach a label to the input cable, identifying the input channel.

3.2 Before attaching the cable to the RF IN terminal, connect it to a signal level meter, then measure and record the level for future reference. Next, detach the cable from the meter and attach it to the RF IN terminal on the Processor rear panel. Should the measured level exceed the specified maximum of +30 dBmV, first install an in-line pad Model PDA of the required rating and equipped with an F-71A adapter or a short coaxial jumper at the RF IN terminal and then attach the input cable to the PDA; see Fig. 11.

3.3 Should the input level be less than the specified minimum of -20dBmV, a pre-amplifier will be required for this particular weak channel; see Tables 4, 5, 6.

3.4 Where a Processor is equipped with a Model CSR which is to be modulated, connect the standby video signal or a 4.5 MHz aural signal to the AUX STBY MOD IN terminal and, where required, the override control lead to terminal #4 on TB1.

3.5 Where a PC-6 is used without a CIS module in the Processor, connect the "event output" leads from the PC-6 as follows:

pin # 2 of PC-6 to terminal #1 of TB1 on the Processor, and  
pin # 3 of PC-6 to terminal #4 of TB1 on the Processor.

Where a CIS module is used in the Processor, connect the "event output" leads from the PC-6 as follows:

pin # 1 of PC-6 to terminal #7 of TB1 on the Processor,  
pin # 2 of PC-6 to terminal #1 of TB1 on the Processor, and  
pin # 3 of PC-6 to terminal #8 of TB1 on the Processor.

Connect the alternate IF input to the IF IN PROGRAM terminal on the Processor, see Fig. 10.

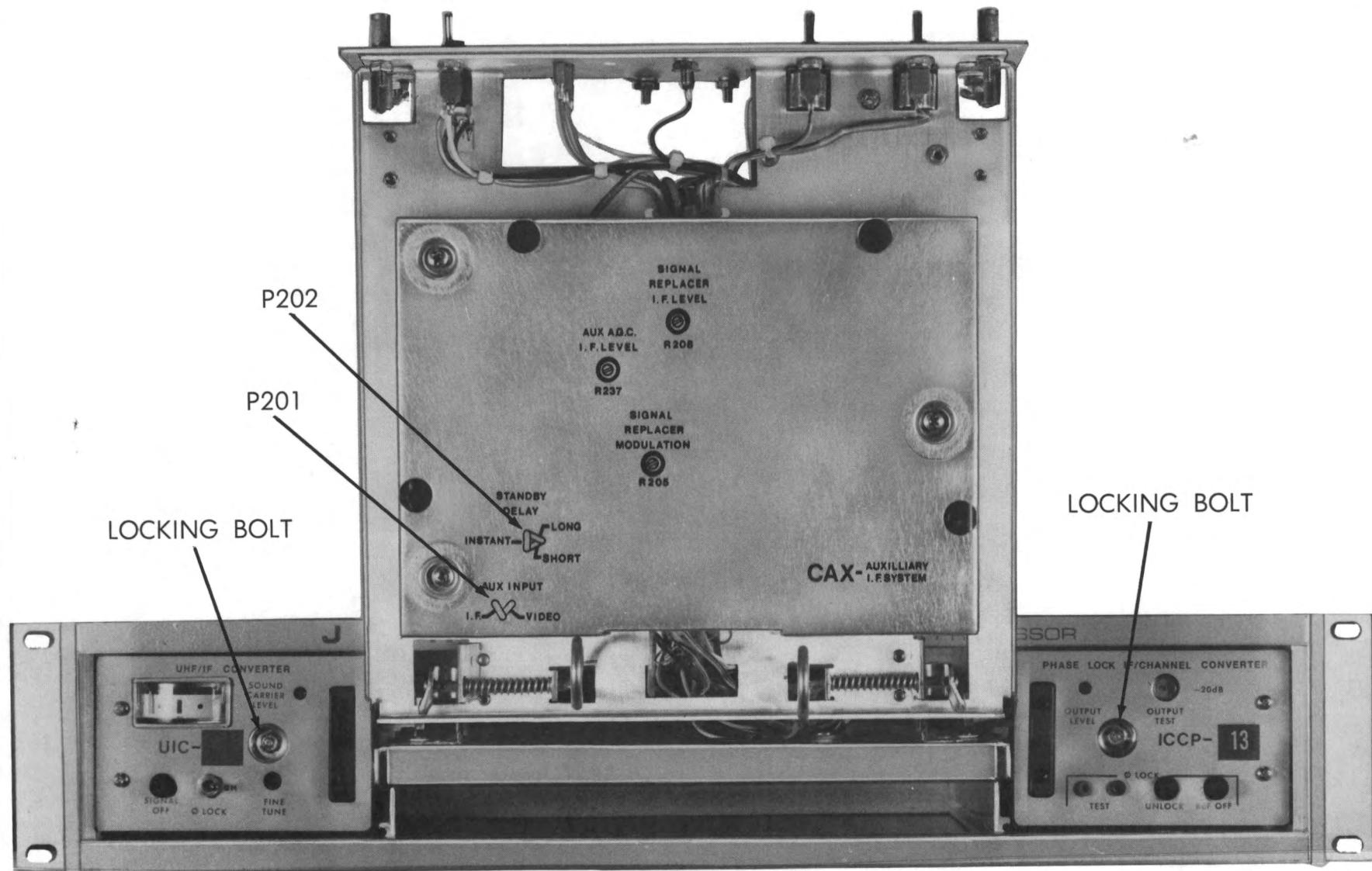


Fig. 5 PROCESSOR WITH PULLED AND FLIPPED-UP CENTER DRAWER

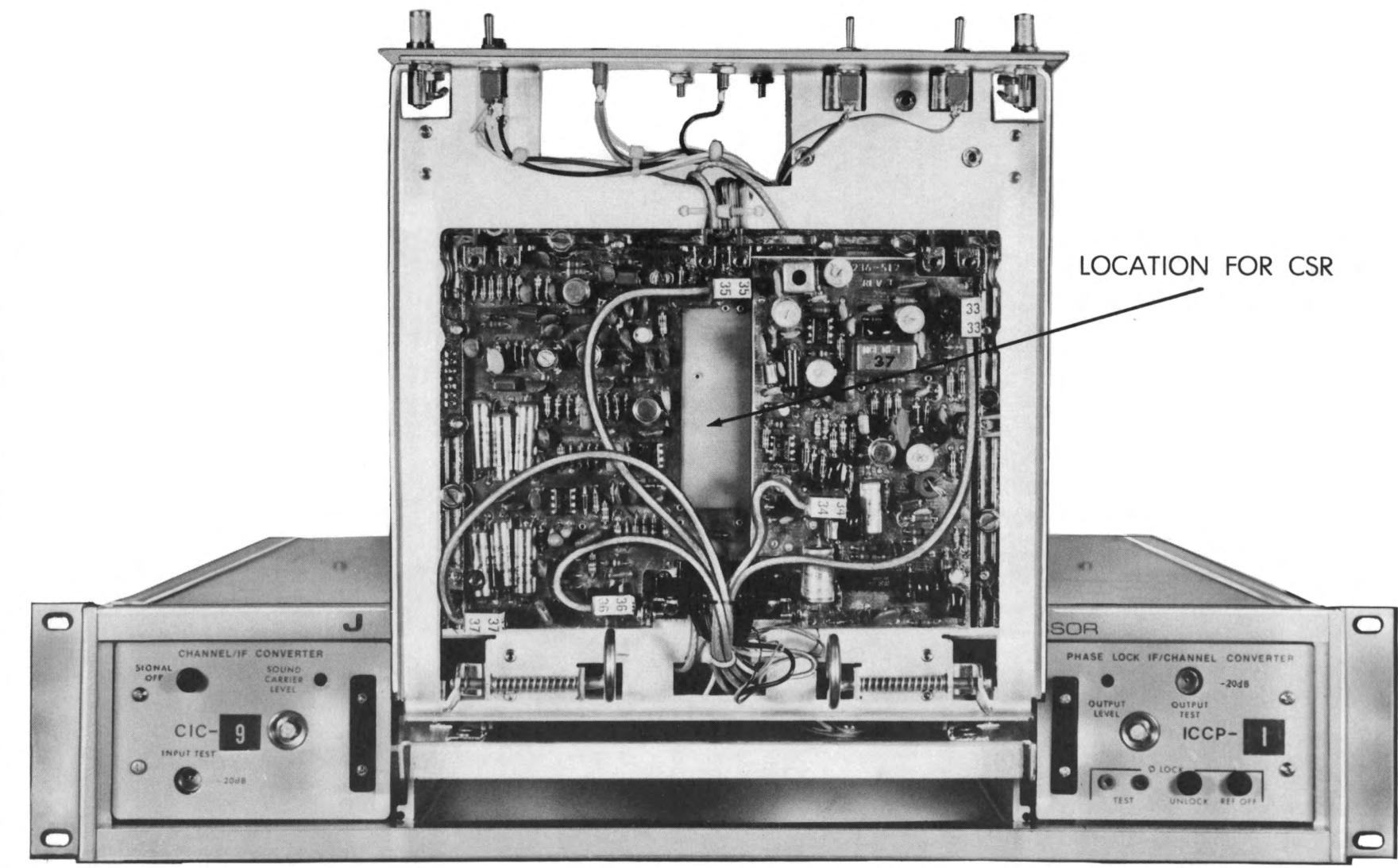


Fig. 6 PROCESSOR WITH BOTTOM COVER REMOVED FROM CENTER DRAWER

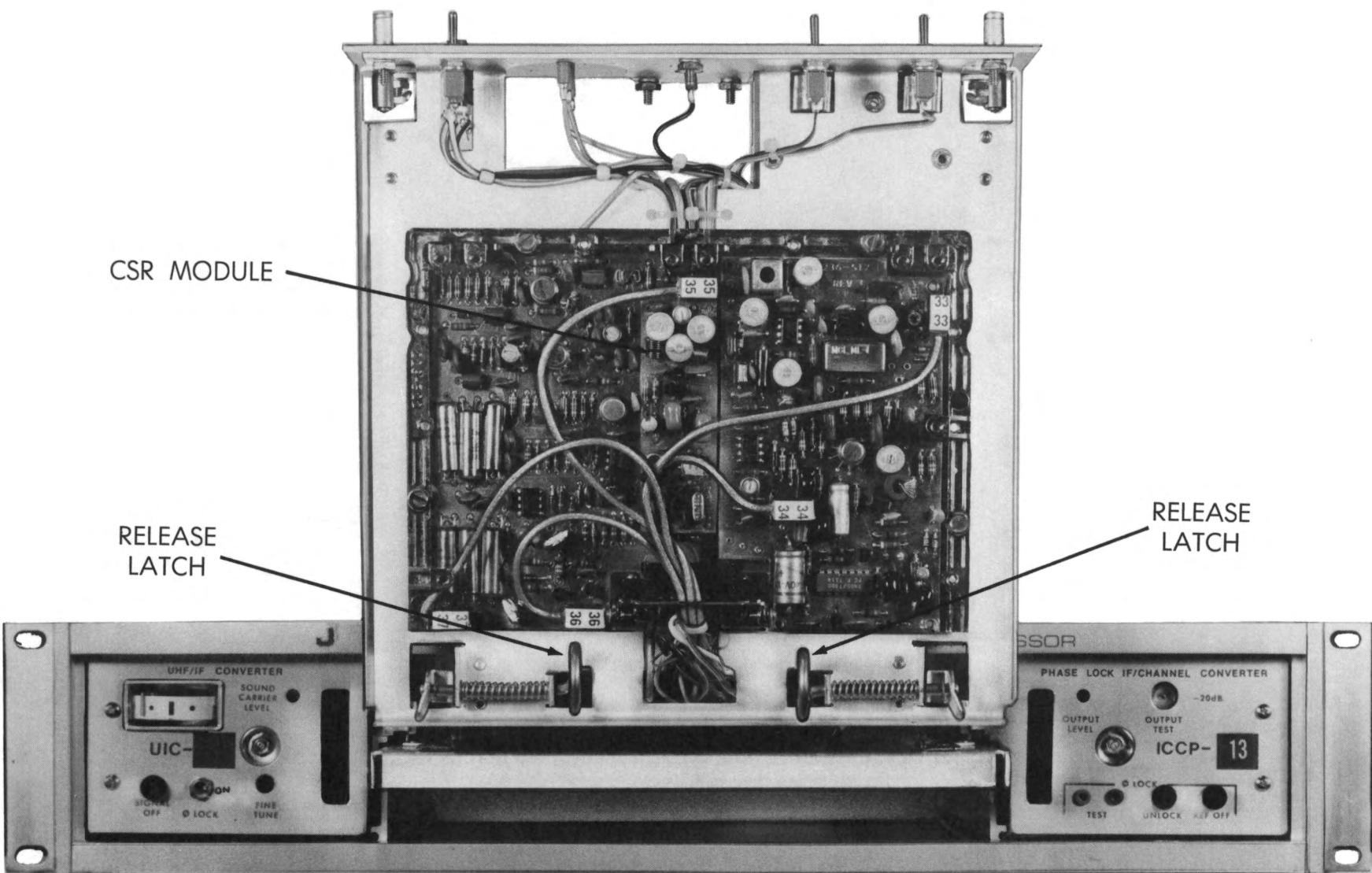


Fig. 7 PROCESSOR WITH CSR MODULE INSTALLED

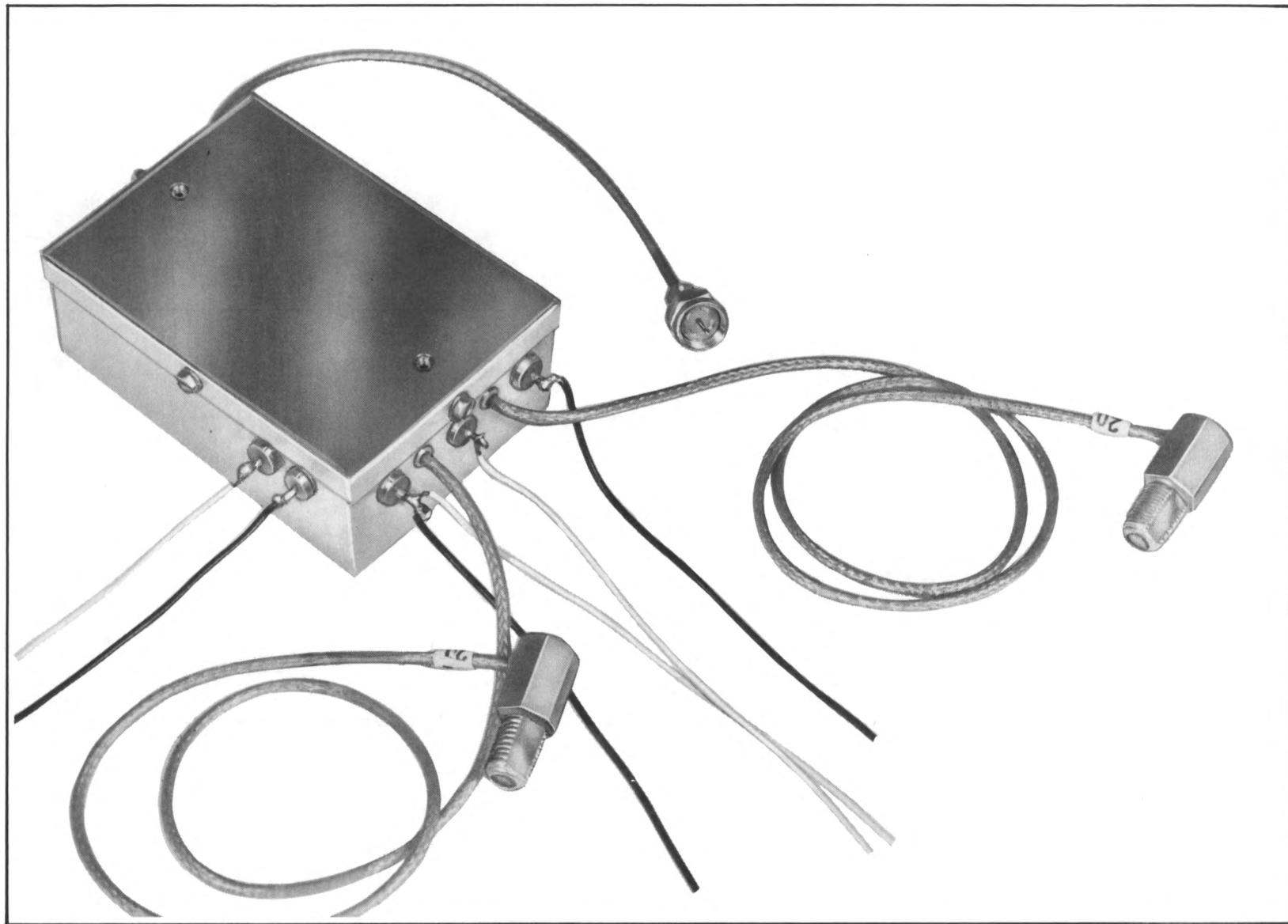


Fig. 8 CIS MODULE

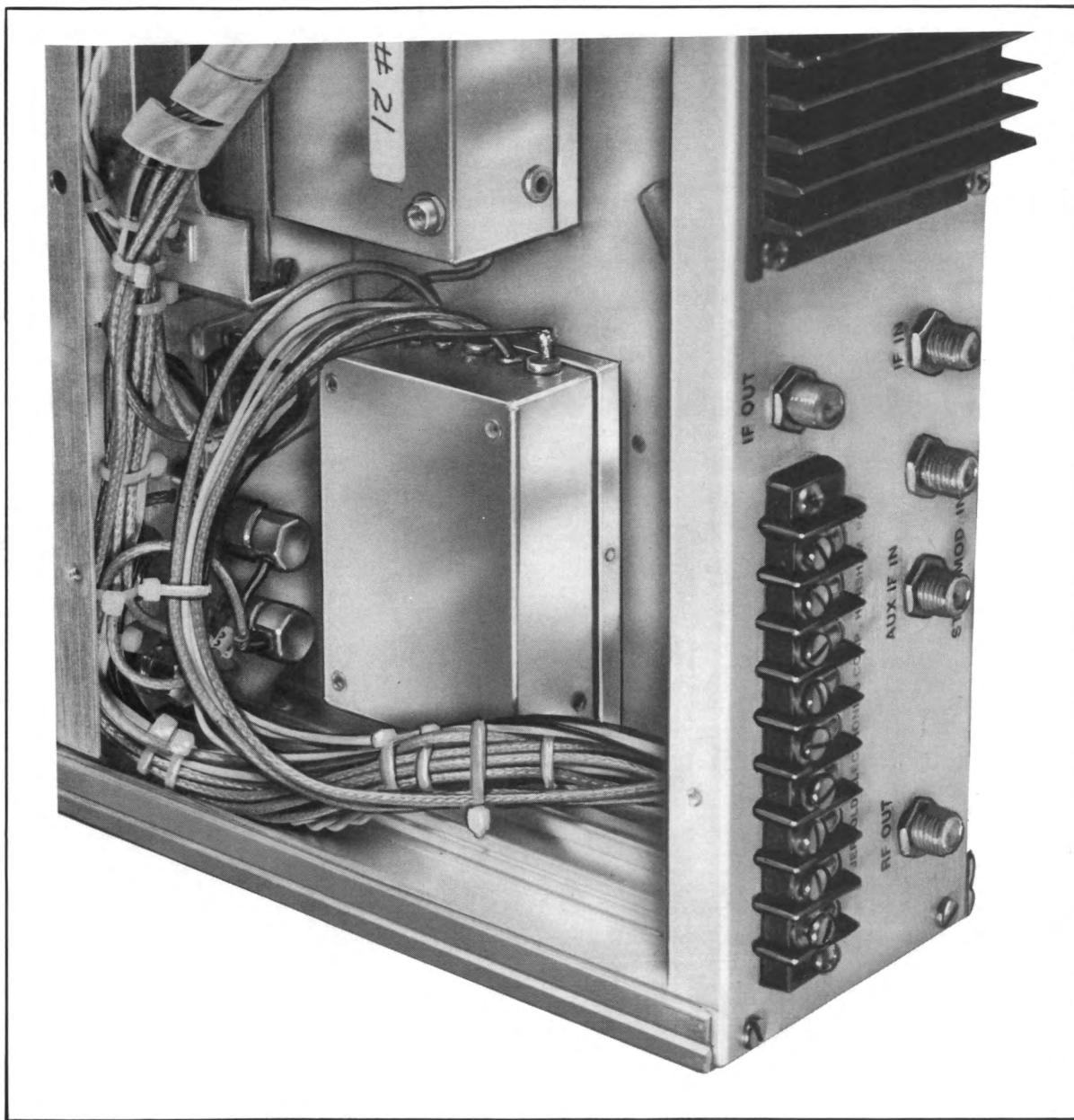


Fig. 9 CIS MODULE INSTALLED

#### 4. INTERCONNECTIONS

- 4.1 Processors are factory-equipped for "on-channel" or "off-channel" operation as ordered by the user. However, a check should be made on the proper setting of the LOCAL OSC. switch located at the right rear top inside the CIC-\* module.
- 4.2 Remove the module from the Processor main frame, using a 1/4" nut driver on the locking bolt (see Fig. 5) and pulling the module straight out. The switch is to be set to EXT for on-channel operation, or to INT for off-channel operation. Then return the module to the operating position and lock it to the main frame.
- 4.3 Connect the RF OUT terminal through a coaxial jumper of sufficient length to the head-end combiner.
- 4.4 Two coaxial jumpers are supplied with each Processor. Use one jumper for inter-connecting the L.O. IN and L.O. OUT terminals on the Processor rear panel when on-channel operation is called for. The second jumper is only needed when the IF signal is not used for programming; in that case the second jumper should be connected between the IF OUT and IF IN NORMAL terminals on the rear panel of the Processor.

#### 5. OFF-AIR PHASE LOCK OPERATION CONNECTIONS

- 5.1 Make sure the LOCAL OSC switch on the CIC-\* module is in the INT (off-channel) position. Note that UIC-\* modules have no such switch.
- 5.2 Connect the RF OUT terminal as in step 4.3 above.
- 5.3 Connect the cable carrying the off-air channel reference signal to a signal level meter and measure and record the signal level for future reference. The level should be +20 to +40 dBmV; if it is higher, an appropriate in-line pad should be installed, as described in the foregoing paragraph 3.2 and Fig. 11, at the PHASE LOCK REF. IN terminal on the Processor rear panel. If the signal level is too low, a single-channel preamplifier is required. Then connect the input cable to the PHASE LOCK REF. IN terminal or to the in-line pad, as needed.
- 5.4 Use one or both the coaxial jumpers from the accessory package as described in paragraph 4.4 above.

### OPERATION

#### 1. TURN-ON

- 1.1 Plug the line cord of the Processor into the associated AC outlet; the AC POWER pilot lamp on the front panel should light up. Then flip the B+ front panel switch to the ON position; the B+ pilot lamp on the front panel should light up.
- 1.2 Flip the MAIN I.F. and AUX. I.F. switches on the front panel to their AGC positions; if the Processor is equipped for phaselock operation, the UNLOCK and REF OFF lights on the ICCP module should go dark, even after initial blinking. Where the unit is equipped with a UIC-\* module, flip the  $\phi$  LOCK switch to the OFF position and note the position of the indicator on the phaselock meter scale; then switch to the  $\phi$  LOCK

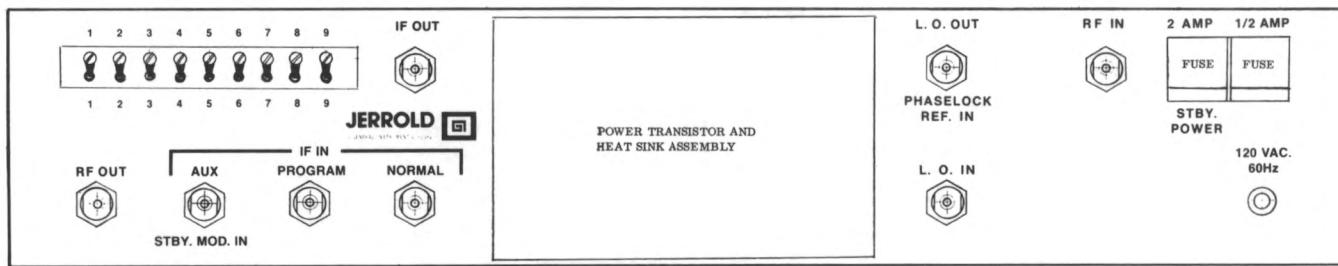


Fig. 10 PROCESSOR REAR PANEL

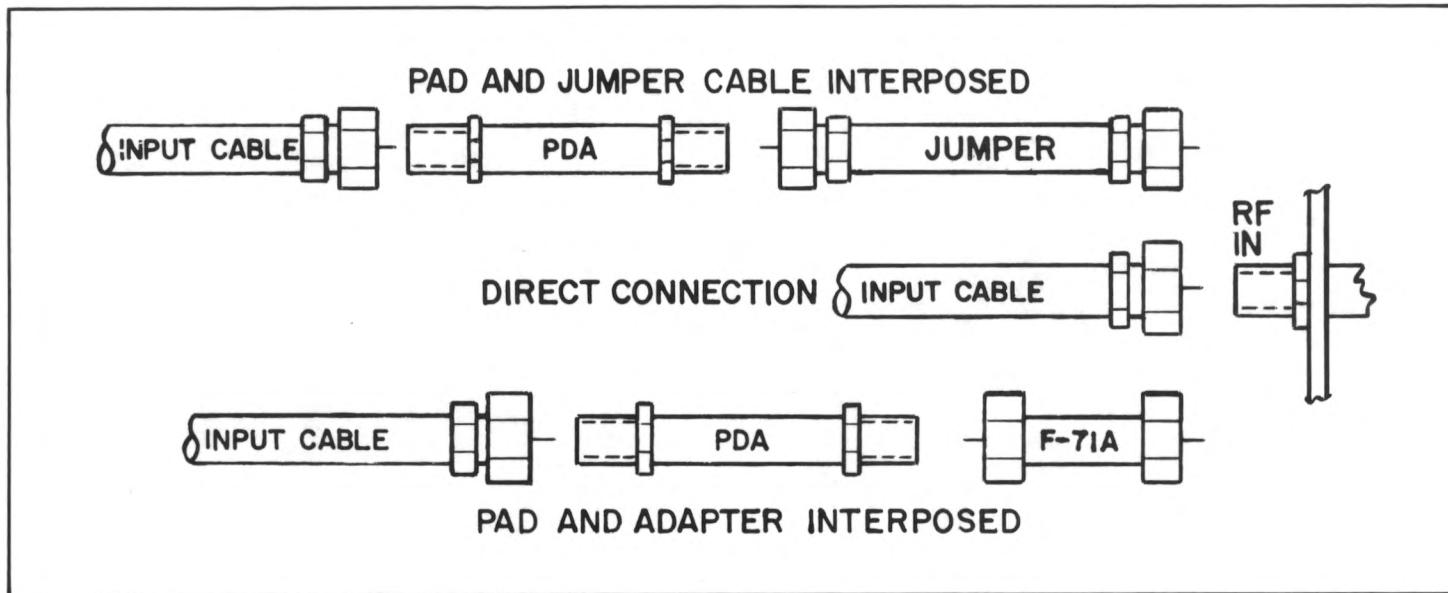


Fig. 11 RF INPUT LEVEL PADDING METHODS

ON position and, if needed, adjust the FINE TUNE control on the UIC-\* front panel to place the meter indicator in the same position as noted before.

NOTE: A Model PMG-61F push-in adapter for use as an interface between signal level meter test cables and the coaxial test terminals on the Commander III front panel is factory-supplied with each unit.

- 1.3 Connect a signal level meter, tuned to the appropriate video carrier, to the INPUT TEST terminal on the CIC front panel and record the signal level, taking into account the 20 dB attenuation at that terminal. Repeat the procedure with the sound carrier; then disconnect the meter.
- 1.4 The MAIN I. F. and AUX. I. F. gain controls in the MANUAL mode do not need adjustment for initial set-up! They may be used for trouble shooting or in an emergency for manual gain mode operation of the unit.

## 2. OUTPUT LEVEL SETTING

- 2.1 Connect the signal level meter to the OUTPUT TEST -20 dB terminal on the front panel of the ICC (or ICCP) module. Tune the meter to the video carrier of the appropriate output channel and, if needed, adjust the OUTPUT LEVEL control as required by system design. Record the output level for future reference. Repeat this procedure for the sound carrier of the channel and, if needed, adjust the SOUND CARRIER LEVEL control to obtain a level of 15 dB below the video carrier level. Then disconnect the meter.

## 3. DEPTH OF VIDEO MODULATION SETTING ON CSR MODULE.

- 3.1 If the Processor has been equipped with a signal replacer module and has a standby video input, it may be necessary to adjust the depth of video modulation of the replacement signal. The best method would be to use a frequency spectrum analyzer, but since such equipment may not be available, the next best method is to use a signal level meter, an oscilloscope, and a variable attenuator. Alternatively, a directly connected TV receiver can be employed; however, this method is not accurate and is subject to the experience one has in the correct interpretation of the characteristics of television pictures.
- 3.2 The CSR module is activated either by the absence of an RF signal at the Processor input or by an override connection. The activation time is controlled by the setting of P202 on the CAX module in the case of signal absence; this condition is indicated by the SIGNAL OFF pilot lamp on CIC (or UIC) module front panel coming on.
- 3.3 Pull out the center drawer and lock it in vertical position. Then connect a signal level meter, tuned to the IF video carrier, to the AUX I. F. -30 dB test terminal on the drawer front panel and adjust the SIGNAL REPLACER I. F. LEVEL control on the drawer bottom cover for a reading of 0 dB or less as required. Disconnect the meter.
- 3.4 Depth of Modulation Setting with an Oscilloscope and Signal Level Meter.
  - 3.4.1 Disconnect the RF OUT jumper cable from the head-end combiner (or replace the jumper by another of suitable length) and connect it instead to a variable attenuator;

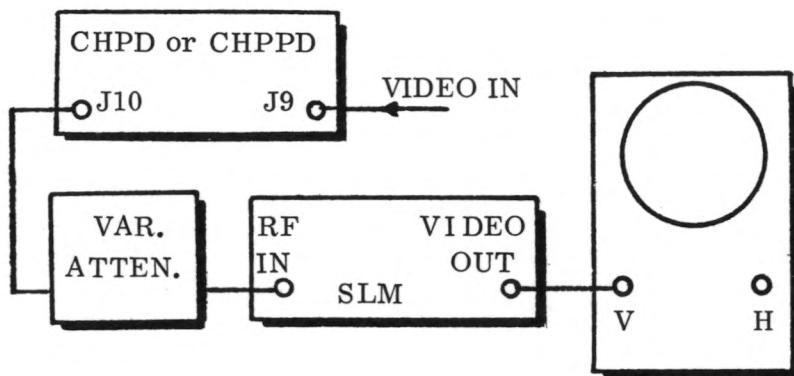


Fig. 12 Test Set-Up for Adjusting Depth of Video Modulation

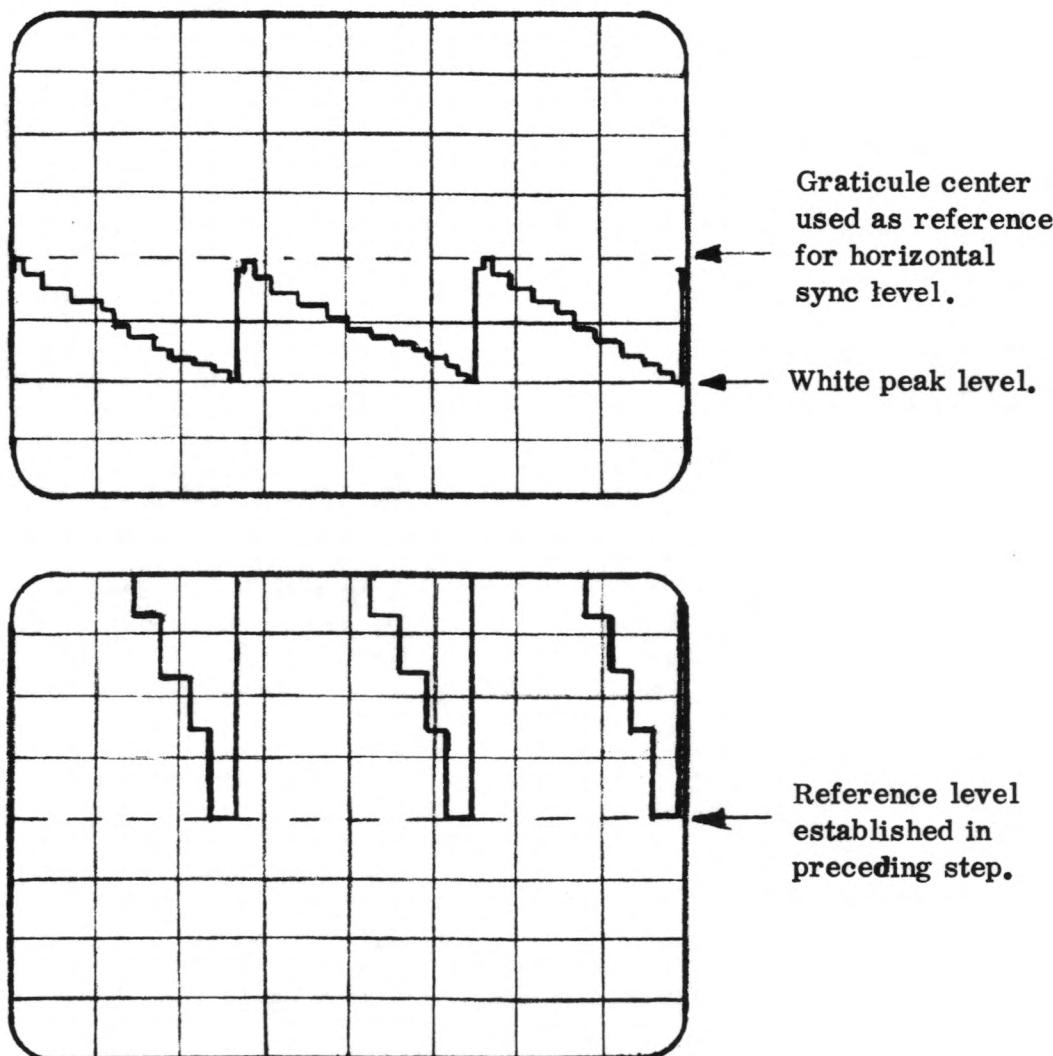


Fig. 13 Stair-case presentation for setting depth of video modulation.

connect the variable attenuator output to the RF input jack of a signal level meter and then connect the video output jack of the signal level meter to the vertical input of an oscilloscope. Set the oscilloscope for d.c. coupling and the variable attenuator to 0dB.

3. 4. 2 For a staircase presentation set the oscilloscope vertical sensitivity to 0.2 V/cm and the sweep rate to 20  $\mu$ s/cm to display 2 to 3 horizontal lines. Set the sync to " internal ". For program video set the sweep rate to 2 ms/cm to display one frame and set the sync to " line " ( 60 Hz ).
3. 4. 3 Tune the signal level meter to the video carrier output frequency and set the step attenuator on the meter to obtain a reading between 0 and 10 dB.
3. 4. 4 Remove 20 dB from the step attenuator on the meter and then rotate the SIGNAL RE-PLACER MODULATION control R205 on the center drawer bottom clockwise to obtain a video waveform display on the oscilloscope . The waveform should be 1 to 1.5 V p-p maximum; if necessary, adjust the " compensator " control on the signal level meter for 1.5 V maximum. Slowly continue increasing the modulation until peak clipping is displayed, then slightly back up the setting to just below that level.
3. 4. 5 Insert attenuation into the variable attenuator corresponding to the desired depth of modulation as follows:  
18 dB for 87.5%  
16 dB for 84.0%  
15 dB for 80.0%  
12 dB for 75.0%  
11 dB for 70.0%

Increase the vertical sensitivity of the oscilloscope to 0.1 V/cm and adjust the presentation for a convenient display of the sync tips. Remove the attenuation from the variable attenuator inserted in the preceding step. Now adjust R205 until the peaks of the video waveform coincide with sync tip levels; see Fig.13.

- Notes
- a. Where the video source signal does not include a VIT ( vertical interval test ) signal as a maximum white level reference, it is recommended that depth of modulation be set at 80% or less to prevent subsequent over-modulation.
  - b. Since a signal level meter has a relatively narrow-band detector, it may be necessary to reduce the maximum depth of modulation below 87.5% to compensate for the contribution of high frequency components.

Disconnect the test equipment , return the center drawer to normal operating position and reconnect the RF output cable to the Processor. If the RF input cable was removed for this test, also restore that cable to its jack on the Processor.

3.5 Depth of Modulation Setting with a TV Receiver.

- 3.5.1 It is assumed that the receiver is a well-adjusted set. Since the input to the set should be about 10 dBmV, it may be necessary to insert an in-line pad or a variable attenuator between the RF OUT terminal on the Processor rear panel and the TV set.
- 3.5.2 Adjust R205 on the CSR module through the bottom cover of the drawer until whitening and loss of detail becomes discernable in the bright areas of the TV picture. Now reduce the modulation setting until no whitening can be seen. This adjustment should be performed during the time the picture shows a high white content in order to prevent subsequent overmodulation.
- 3.5.3 Disconnect the TV receiver and return the center drawer to normal operating position. Reconnect the RF output cable to the processor and, if the RF input cable was removed for this test, also reconnect that cable to the processor.

#### 4. SOUND TRAP FIELD ADJUSTMENT

4.1 Processor equipment, when subjected to severe handling during shipment, or when associated with offset broadcast frequency assignments at the antenna input, may require re-optimization of the accompanying and adjacent sound traps at the time of installation.

#### 4.2 ADJACENT SOUND CARRIER TRAP ADJUSTMENT

Remove the top cover from the CHP main frame. Connect the normal R. F. signal and place the unit into normal operation.

4.2.1 Connect a spectrum analyzer to the R. F. output terminal and observe the relative level of the adjacent sound carrier.

4.2.2 Alternately adjust C607 and C612 on the filter Model IFF, located in the rear section of the main frame ( see Fig. 15 ), for minimum adjacent sound carrier level. Make adjustments in small increments and repeat for optimum performance.

#### 4.3 ACCOMPANYING SOUND TRAP ADJUSTMENT

This adjustment, if necessary, can also be performed with the Processor in normal operation. Extend the center drawer and remove the CIA cover.

4.3.1 a. With Signal Level Meter: Set the sound carrier level control to its maximum clockwise position. Connect a signal level meter to the R. F. or I. F. output and tune the meter to indicate the sound carrier level.

b. With Spectrum Analyzer: Connect the analyzer to the R. F. or I. F. output and observe the relative sound carrier level.

4.3.2 Remove P303 from the CIA P.C. board. Now carefully adjust each trimmer on the CIA sound trap box ( see Fig. 16 ) for minimum sound carrier level as indicated by the meter or analyzer. A level of -35 dB or lower, relative to the video carrier level, is satisfactory for sound carrier regulation.

4.3.3 Replace P303 and reset the desired relative sound carrier level with the front panel SOUND CARRIER LEVEL control.

NOTE: Although normally not required at installation, the procedure described in section 4.2 may be used to re-optimize the adjacent video carrier rejector. In this case, adjust C609 and C601 for minimum adjacent video carrier level.

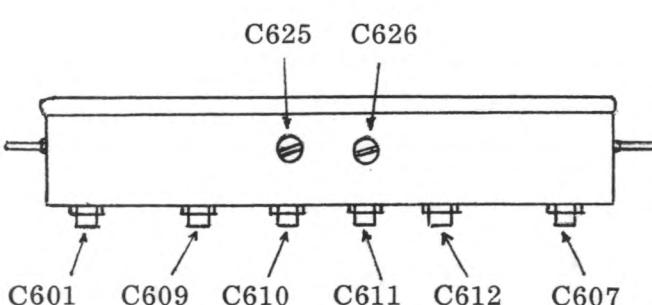


Fig. 15

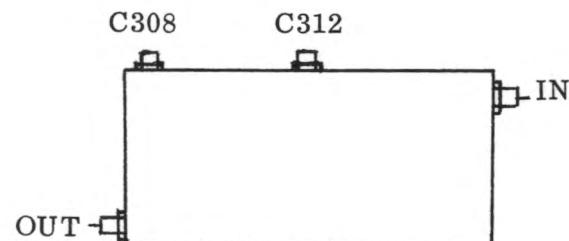


Fig. 16

## COMMANDER III MODULATOR

### INSTALLATION

#### 1. BENCH INSTALLATION OF OPTIONAL MODULES

1.1 Both Models CIS and CSR are installed in the same manner as explained for the Processor in the preceding section.

1.2 Where a Model CST-4.5 Video/Audio Separator is needed as an interface to a microwave receiver install the CST-4.5 as conveniently as practicable at the rear of the Modulator.

#### 2. MOUNTING

2.1 Rack or cabinet mounting of a Modulator is done in the same manner as explained for the Processor.

#### 3. INPUT CONNECTIONS

3.1 The Modulator is designed to accept video and audio signals from any source, such as a video tape recorder, or microwave baseband video and 4.5 MHz aural carrier via the CST-4.5 referred to above.

3.2 Where the Modulator has been equipped with a CSR module, and the replacement signal is to be modulated, connect the standby video source to the AUX STBY MOD IN terminal at the Modulator rear panel and, if required, the override control lead to terminal #4 on TB1.

3.3 Where the Modulator has been equipped with a CIS module, connect the "event output" leads from the PC-6 to terminal #7 (NORMAL IF) and terminal #8 (PROGRAM IF) of TB1, and then connect the ground terminal #6 of J1 on the PC-6 to the #1 terminal of TB1 on the modulator.

3.4 Connect the alternate IF input to the IF IN PROGRAM coaxial terminal on the Modulator rear panel.

#### 4. INTERCONNECTIONS

4.1 The Modulator is factory-equipped with an INPUT AUDIO/4.5MHz switch, factory-set to the AUDIO position. Where a 4.5 MHz input is used, the switch which is located at the top of the CAM circuit board must be reset to the 4.5 MHz position; unlock the bolt on the module front panel, pull out the module and reset the switch; then return the module to operating position.

- 4.2 Connect the video source to the VIDEO IN terminal on the modulator rear panel.
- 4.3 For connection of the audio source to the AUDIO IN "Cannon" jack on the modulator rear panel a separately procured "Cannon" plug is required. Installation of the this plug is as follows ( see Fig.14 ) :
- Push the protective rubber boot into the barrel so that it is properly seated in the groove of the barrel collar.
  - Mate the collar clamp with the barrel, slightly engaging the two clamp screws.
  - Slide the barrel well up over the wire harness ( 3-wire cable ) then slide the insulating bushing over the harness towards the barrel.
  - Prepare and tin the wire ends and then solder them into their associated pins; pin #1 is the common, and pins #2 and 3 are the signal carrying pins.
  - Slide the barrel forward and push the plug into the barrel so that the key on the plug fits into the keyway of the inner surface of the barrel.
  - Force the plug all the way into the barrel until the threaded hole of the plug matches with the hole in the barrel; then secure the plug with the small screw supplied in the bag.
  - Tighten the two screws on the barrel collar clamp.

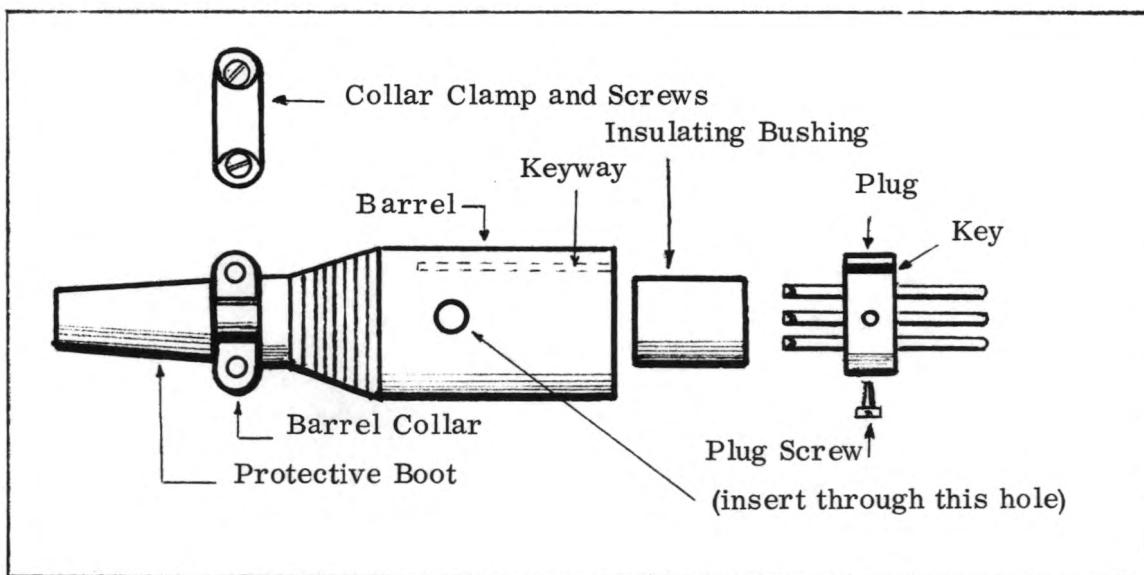


Fig.14 INSTALLATION OF CANNON PLUG  
Model XLR-3-12SC

- 4.4 With the coaxial jumper supplied, connect the IF OUT terminal to the IF IN NORMAL terminal on the Modulator rear panel, except where programming is employed; see the relevant instructions in the Processor section.
- 4.5 Connect the RF OUT terminal on the Modulator rear panel through a coaxial jumper of sufficient length to the associated input terminal on the head-end combiner.

- 4.6 Where a phaselock-equipped Model CMMP-\* is involved, the only additional connection required is the coaxial cable carrying the off-air reference channel to be attached to the PHASELOCK REF. IN terminal at the Modulator rear panel.
- 4.7 Where a microwave source and the CST-4.5 are used, connect one of the two jumpers supplied with the CST-4.5 between the VIDEO terminal on the CST-4.5 and the VIDEO IN terminal on the Modulator rear panel; connect the second jumper between the 4.5 MHz terminal on the CST-4.5 and the 4.5 MHz IN terminal on the Modulator rear panel.

## OPERATION

### 1. TURN-ON

- 1.1 Plug the line cord of the Modulator into the associated AC outlet; the AC POWER pilot lamp on the front panel should come on. Then flip the B+ switch on the front panel to the ON position ; the B+ pilot lamp should be lit.
- 1.2 If the Modulator is equipped for phaselock ( ICCP module ) the  $\emptyset$  LOCK /UNLOCK and REF OFF pilot lights should go dark even after initial blinking.
- 1.3 Set the rotary METER FUNCTION switch to the B+ position and check the meter reading; it should be +20 VDC on the B+ scale. Where a phaselocked unit is used, set the METER FUNCTION switch to the  $\emptyset$  LOCK position; the indicator on the meter should stay in the green area of the scale. A short period may pass until the AGC circuitry stabilizes after switching from MANUAL to AGC position.

### 2. OUTPUT LEVEL SETTING

The same procedure as given for the Processor applies here.

### 3. DEPTH OF VIDEO MODULATION SETTING

- 3.1 Set the METER FUNCTION switch to the VIDEO MOD position and, if needed, adjust the VIDEO MOD control on the CAM front panel for a reading of 87.5% on the meter scale.

Note: Where the video signal does not include a VIT ( vertical interval test ) or other waveform with a reference for maximum white level, it is recommended to reduce the depth of modulation to 80% or less to prevent over-modulation at a later time.

### 4. DEPTH OF VIDEO MODULATION SETTING ON CSR MODULE.

The same procedure as given for the Processor applies here.

### 5. SOUND CARRIER ADJUSTMENT

- 5.1 Connect a signal level meter through the PMG-61F adapter to the IF -30dB TEST terminal on the center drawer ; tune the meter to the 41.25 MHz sound carrier and, if needed, adjust the SOUND CARRIER LEVEL control on the CAM front panel to obtain a reading of -15 dB relative to the video carrier level, or as may be otherwise required by system design. Disconnect the meter.

Note: The IF LEVEL potentiometer R330 on top of the center drawer cover is factory-set and does not require adjustment for initial set-up!

## 6. AUDIO MODULATION ADJUSTMENT

- 6.1 Set the METER FUNCTION switch to the AUDIO MOD position and , if needed, adjust the SOUND DEVIATION control on the CAM module to obtain a meter reading of 25 kHz during audio peaks.

Note: The two DEVIATION test jacks on the CAM module allow the connection of a set of 600-ohm impedance earphones for monitoring the audio signals applied to the Modulator. The jacks also permit connection of a VOM or VTVM when it is desired to adjust the SOUND DEVIATION control; in that case, the normal audio input signal to the AUDIO IN terminal on the Modulator rear panel should be disconnected and replaced by a 400 Hz tone at the desired peak program audio level.

This completes the operational set-up of the Modulator.

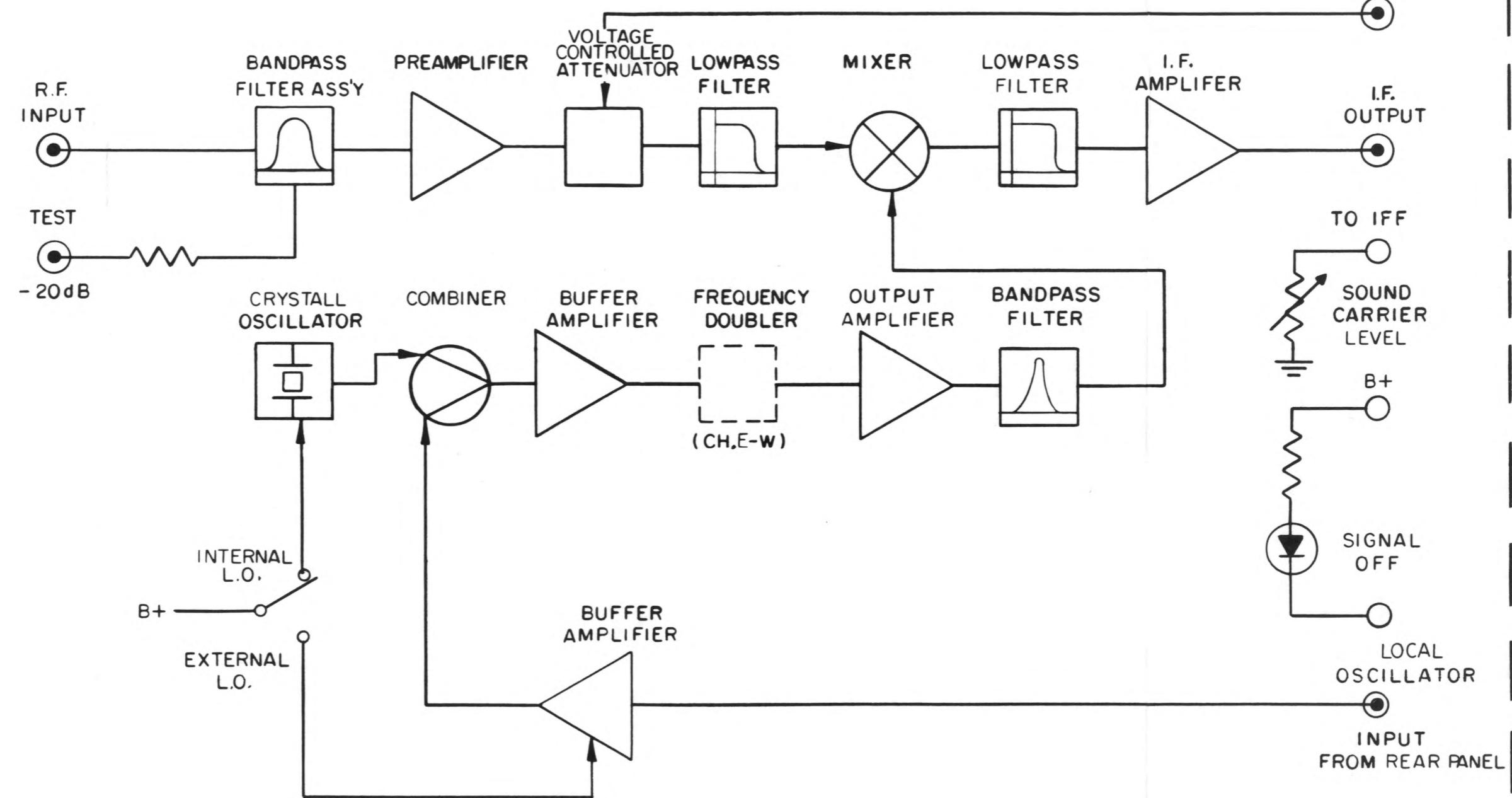
## MAINTENANCE

A detailed troubleshooting and alignment procedure for Commander III equipment will be published as soon as possible and holders of this manual will automatically receive copies. Functional block diagrams and interconnection wiring schematics are appended here.

All data subject to change without notice.

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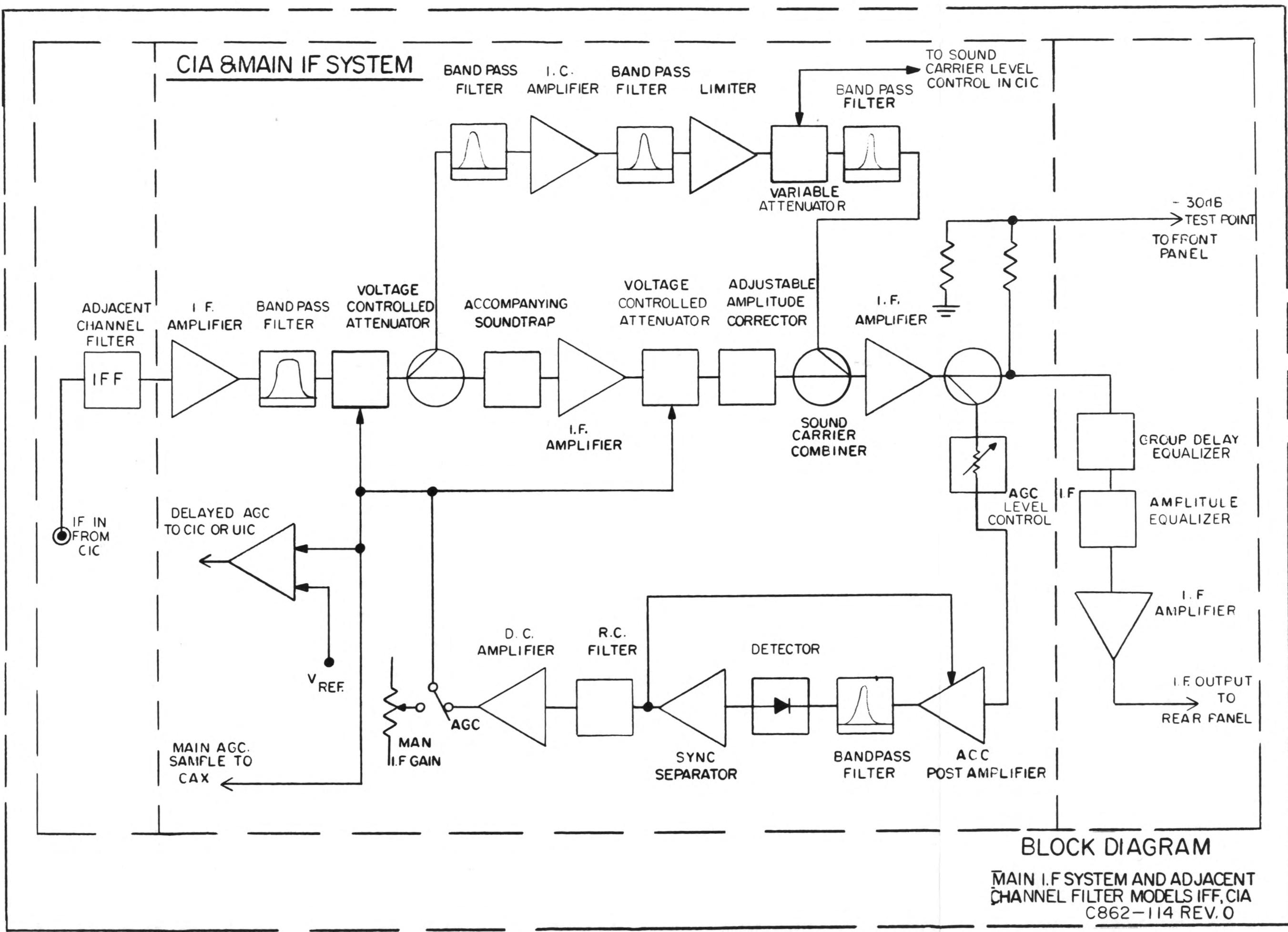
CIC - BLOCK DIAGRAM

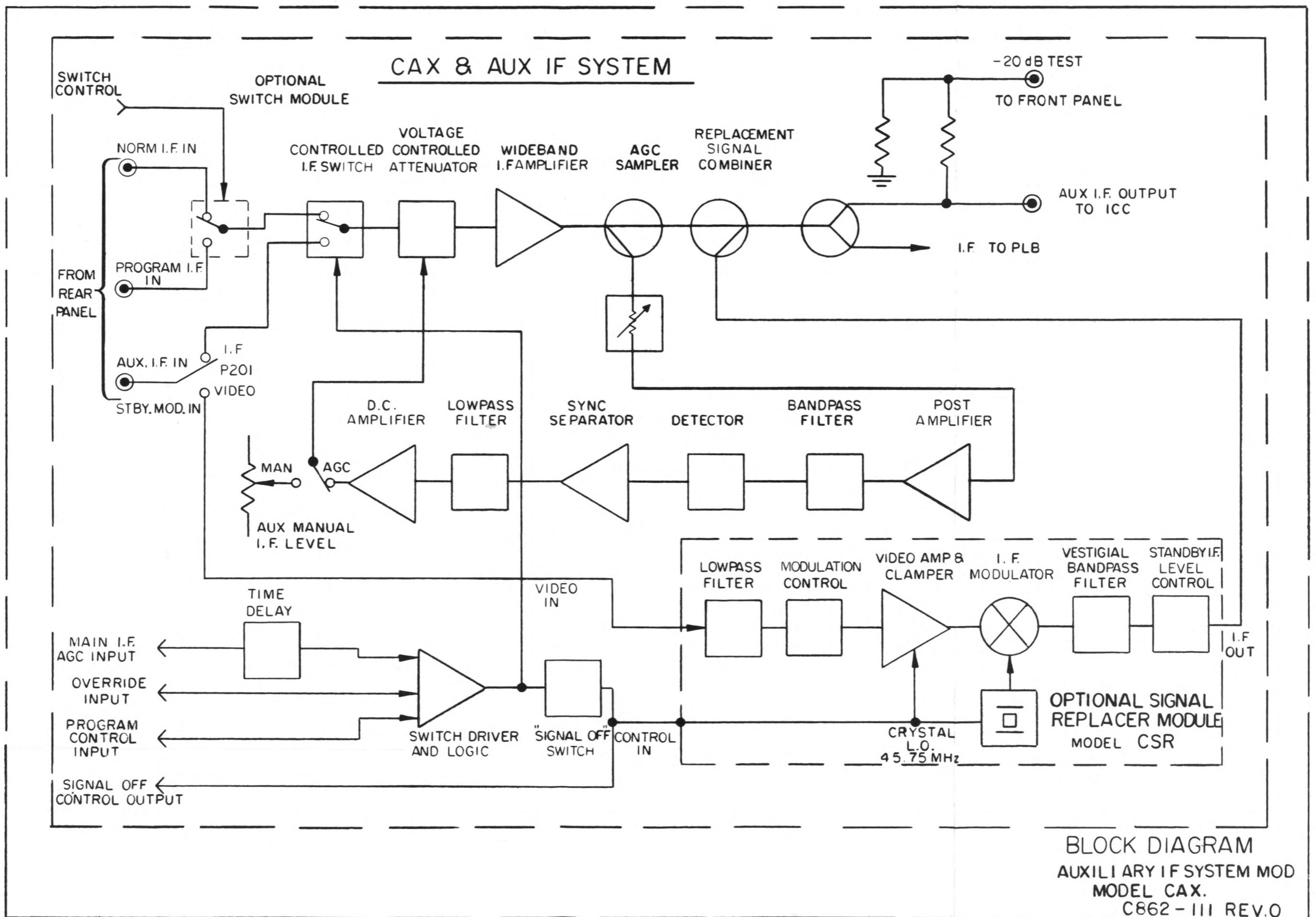


BLOCK DIAGRAM

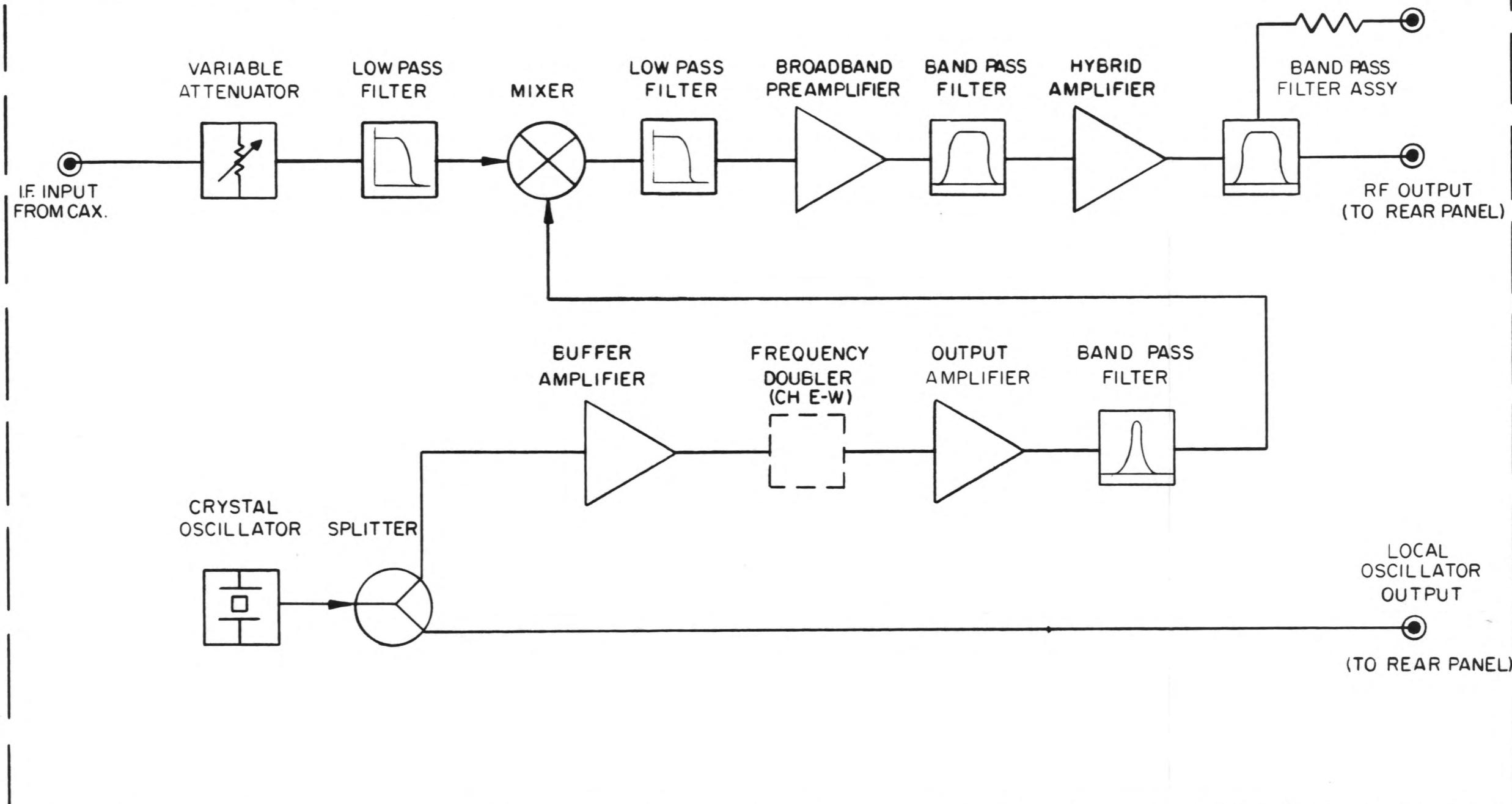
CHANNEL TO I.F CONVERTER  
MODULE — MODEL CIC-\*

D862-II3 REV. 0





### ICC BLOCK DIAGRAM



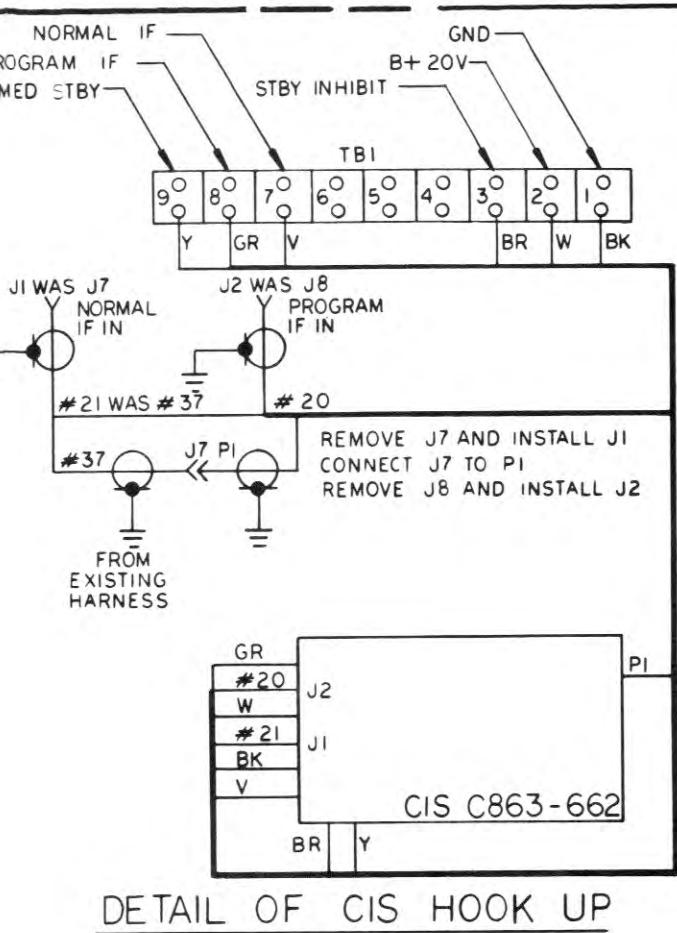
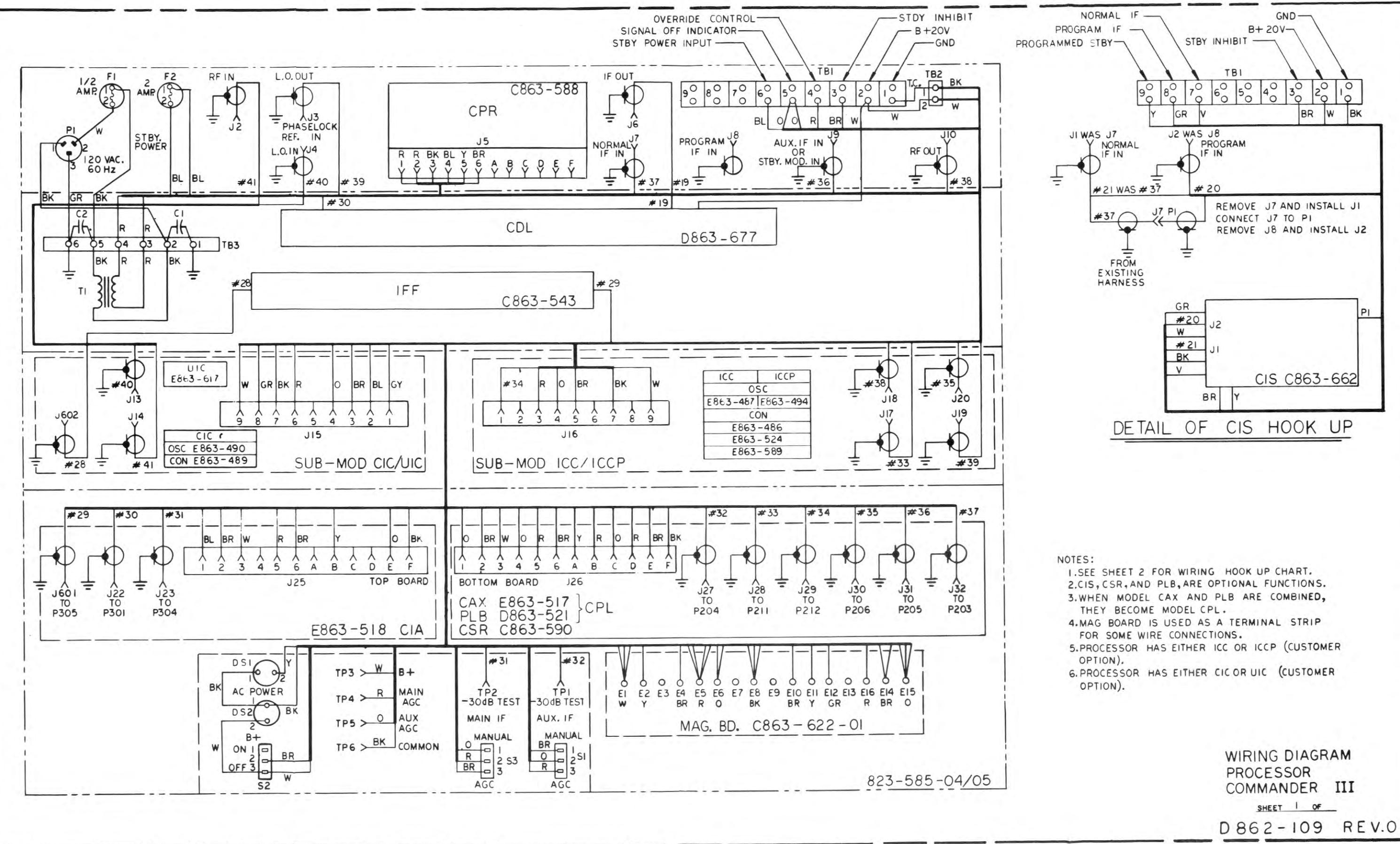
### BLOCK DIAGRAM

I. F. TO CHANNEL CONVERTER  
MODULE MODEL ICC--\*

C 862-112 REV.O

### REPLACEMENT PARTS LIST

MODEL PMF	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
CAPACITORS C1, C2	124-032
FUSES F1 F2	101-335 101-352
FUSE HOLDERS F1, F2	101-811
LAMPS DS1 (Amber) DS2 (Green)	102-302 102-303
SWITCHES S1, S2, S3	162-045
TRANSFORMER T1	C141-309-00



FROM	TO	REMARKS
P1 PIN 1	TB3 TERM 2	BK LINE CORD
P1 PIN 2	F1 TERM 2	W LINE CORD
P1 PIN 3	TB3 TERM 6	GR LINE CORD
F1 TERM 1	TB3 TERM 5	BK #22 WIRE
F2 TERM 1	J5 PIN 4 OR TB1 PIN 6	BL #22 WIRE
F2 TERM 2	TB1 TERM 6	BL #22 WIRE
TB3 TERM 1	TB3 TERM 2	C1,.01μF,1000VDC
TB3 TERM 2	T1 PRIMARY	BK #22 WIRE
TB3 TERM 3	T1 SECONDARY	R #22 WIRE
TB3 TERM 3	J5 TERM 1 OR J5 TERM 2	R #22 WIRE
TB3 TERM 4	J5 TERM 2	R #22 WIRE
TB3 TERM 4	T1 SECONDARY	R #22 WIRE
TB3 TERM 5	TB3 TERM 6	C2,.01μF,1000VDC
TB3 TERM 5	T1 PRIMARY	BK #22 WIRE
J2	J14	COAXIAL #41
J3	J19	COAXIAL #39
J4	J13	COAXIAL #40
J5 PIN 3	TB2 TERM 1	BK #22 WIRE
J5 PIN 5	DS1 PIN 2	Y #22 WIRE
J5 PIN 6	S2 TERM 2	BR #22 WIRE
J5 PIN A TO F	NOT CONNECTED	
J6	CDL BOX	COAXIAL #19
J7	J32	COAXIAL #37
J8	NOT CONNECTED	
J9	J31	COAXIAL #36
J10	J18	COAXIAL #38
TB1 TERM 1	TB2 TERM 1	#22 T.C.
TB1 TERM 2	TB2 TERM 2	W #22 WIRE
TB1 TERM 2	CDL BOX	W #22 WIRE

SEE NOTE 1

FROM	TO	REMARKS
TB1 TERM 3	J26 PIN 6	BR #22 WIRE
TB1 TERM 4	J26 PIN D	R #22 WIRE
TB1 TERM 5	J26 PIN C	O #22 WIRE
TB1 TERM 5	J15 PIN 4	O #22 WIRE
TB1 TERM 7,8 & 9	NOT CONNECTED	
TB2 TERM 1	J15 PIN 7	BK #22 WIRE
TB2 TERM 1	J25 PIN F	BK #22 WIRE
TB2 TERM 1	J26 PIN F	BK #22 WIRE
TB2 TERM 1	E8	BK #22 WIRE
TB2 TERM 2	J15 PIN 9	W #22 WIRE
TB2 TERM 2	J16 PIN 9	W #22 WIRE
TB2 TERM 2	J25 PIN 3	W #22 WIRE
TB2 TERM 2	J26 PIN 3	W #22 WIRE
TB2 TERM 2	E1	W #22 WIRE
J11	NOT USED	
J602	IFF BOX	COAXIAL #28
J15 PIN 1	N.C.	GY #22 WIRE
J15 PIN 2	J25 PIN 1	BL #22 WIRE
J15 PIN 3	J25 PIN 2	BR #22 WIRE
J15 PIN 5	NOT CONNECTED	
J15 PIN 6	N.C.	R #22 WIRE
J15 PIN 8	E12	GR #22 WIRE
J16 PIN 1	J29	COAXIAL #34
J16 PIN 2,6 & 8	NOT CONNECTED	
J16 PIN 3	J26 PIN B	R #22 WIRE
J16 PIN 4	J26 PIN 1	O #22 WIRE
J16 PIN 5	J26 PIN 2	BR #22 WIRE
J17	J28	COAXIAL #33
J20	J30	COAXIAL #35
J601	IFF BOX	COAXIAL #29

FROM	TO	REMARKS
J22	CDL BOX	COAXIAL #30
J23	TP2	COAXIAL #31
J25 PIN 4	NOT CONNECTED	
J25 PIN A,C & D	NOT CONNECTED	
J25 PIN 5	E5	R #22 WIRE
J25 PIN 6	E10	BR #22 WIRE
J25 PIN B	E2	Y #22 WIRE
J25 PIN E	E6	O #22 WIRE
J26 PIN 4	E15	O #22 WIRE
J26 PIN 5	E5	R #22 WIRE
J26 PIN A	E11	Y #22 WIRE
J26 PIN E	E14	BR #22 WIRE
J27	TP1	COAXIAL #32
DS1 PIN 1	DS2 PIN 1	BK #22 WIRE
DS2 PIN 1	E8	BK #22 WIRE
DS2 PIN 2	S2 PIN 3	W #22 WIRE
S1 TERM 1	E14	BR #22 WIRE
S1 TERM 2	E15	O #22 WIRE
S1 TERM 3	E16	R #22 WIRE
S2 TERM 1	NOT CONNECTED	
S2 TERM 3	E1	W #22 WIRE
S3 TERM 1	E6	O #22 WIRE
S3 TERM 2	E5	R #22 WIRE
S3 TERM 3	E4	BR #22 WIRE
TP3	E1	W #22 WIRE
TP4	E5	R #22 WIRE
TP5	E15	O #22 WIRE
TP6	E8	BK #22 WIRE
E3, E7, E9 & E13	NOT CONNECTED	

NOTE:

1. COAXIAL IDENTIFICATION NUMBER IS EQUIVALENT TO TAB NUMBER OF CABLE ASSEMBLY DRAWING D 811- 878 (EXAMPLE: # 37 = 811- 878- 37).

### REPLACEMENT PARTS LIST

#### MODEL CIC OSCILLATOR

ASSEMBLY No. 822-729

DRAWING No. 863-490

SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
CAPACITORS	
C552, C553, C544, C557, C558, C563, C564, C566, C571, C572, C573, C577, C578, C580, C581, C582, C583 C559, C566	124-077
C562	127-079
C568	124-143
C576	128-230-00
C579	124-108
LED	124-121-00
CR551	102-026-00
RESISTORS	
R551, R554, R562, R569, R574	112-977
R553	112-981
R555, R570	112-096
R557, R568, R571, R573	111-015
R558	111-006
R559, R561	112-974
R560	112-976
R565, R572	112-077
R566, R567	112-929
R575	S118-253-00
SWITCH	
S551	162-022
TRANSFORMERS	
T551	C144-417-00
T552	C144-416-00
TRANSISTORS	
Q551	130-194
Q552, Q558	130-226
Q553, Q555, Q556, Q557	S130-607

#### MODEL CIC OSCILLATOR, T7-T11

ASSEMBLY No. 822-756

DRAWING No. 863-490

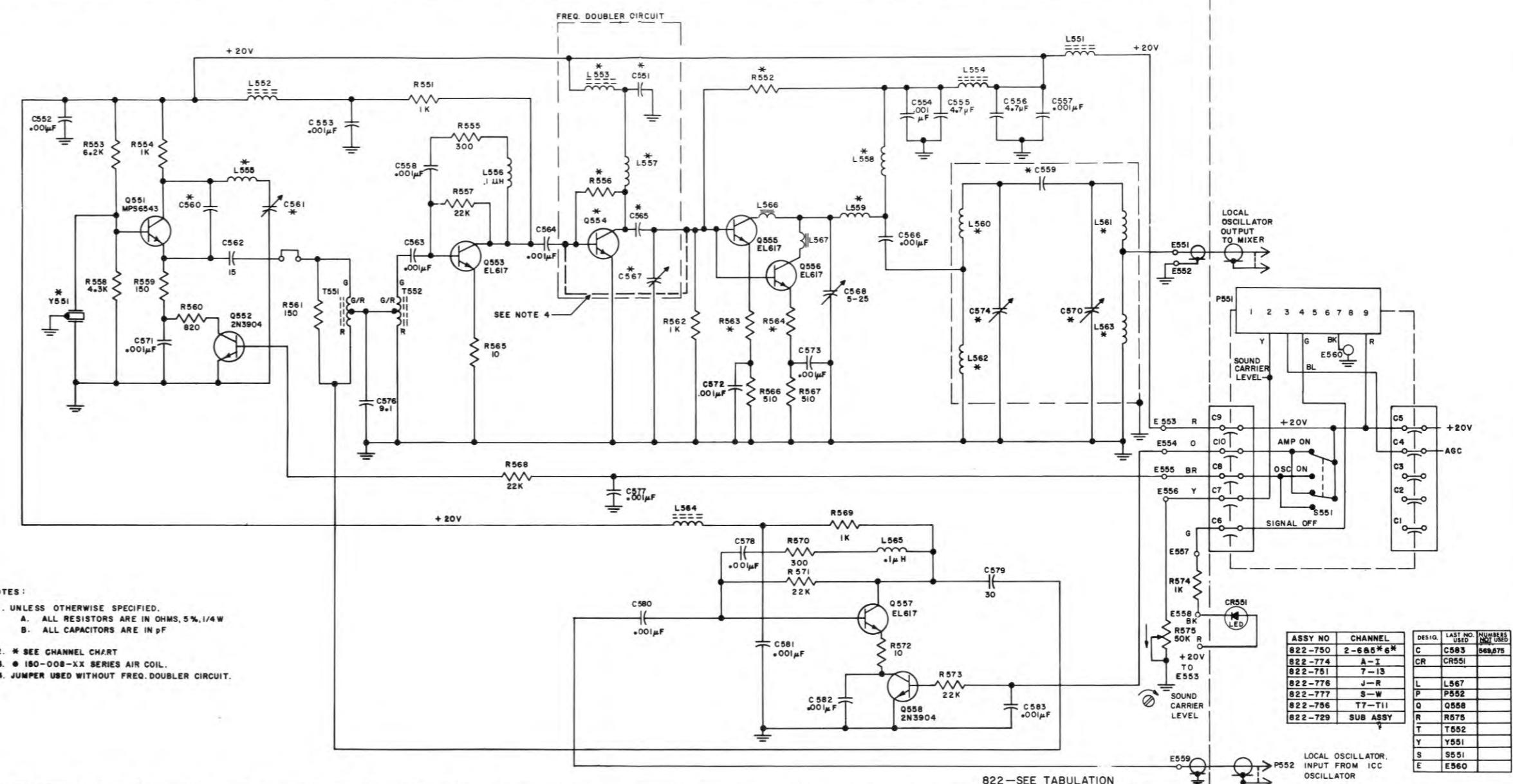
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
CAPACITORS	
C559-T7	122-085
C559-T8	122-055
C559-T9	122-101
C559-T10	122-071
C559-T11	122-103
C560	124-079
C561	128-230-00
C570, C574	128-568
CRYSTALS	
Y551-T7	S139-279-40
Y551-T8	S139-279-41
Y551-T9	S139-279-42
Y551-T10	S139-279-43
Y551-T11	S139-279-44
RESISTORS	
R552	112-979
R563, R564	112-992

#### MODEL CIC OSCILLATOR, 2-6, 5\*, 6\*

ASSEMBLY No. 822-750

DRAWING No. 863-490

SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
CAPACITORS	
C559-2, 3	122-091
C559-4, 5*	122-055
C559-5, 6, 6*	122-101
C560	124-087
C561	128-230-00
C570, C574	128-568
CRYSTALS	
Y551-2	S139-279-00
Y551-3	S139-279-01
Y551-4	S139-279-02
Y551-5	S139-279-03
Y551-6	S139-279-04
Y551-5*	S139-279-38
Y551-6*	S139-279-39
RESISTORS	
R552	112-979
R563, R564	112-992

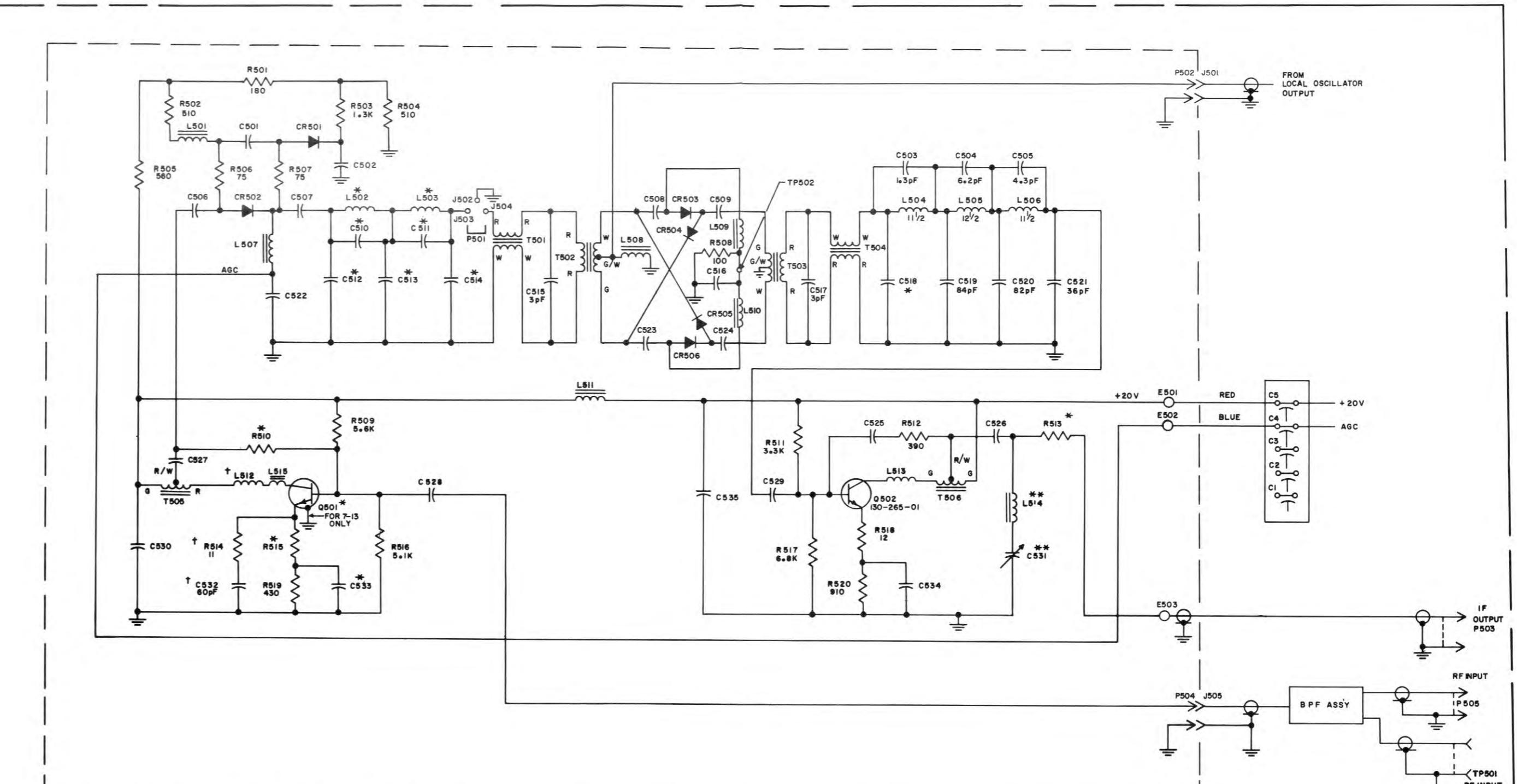
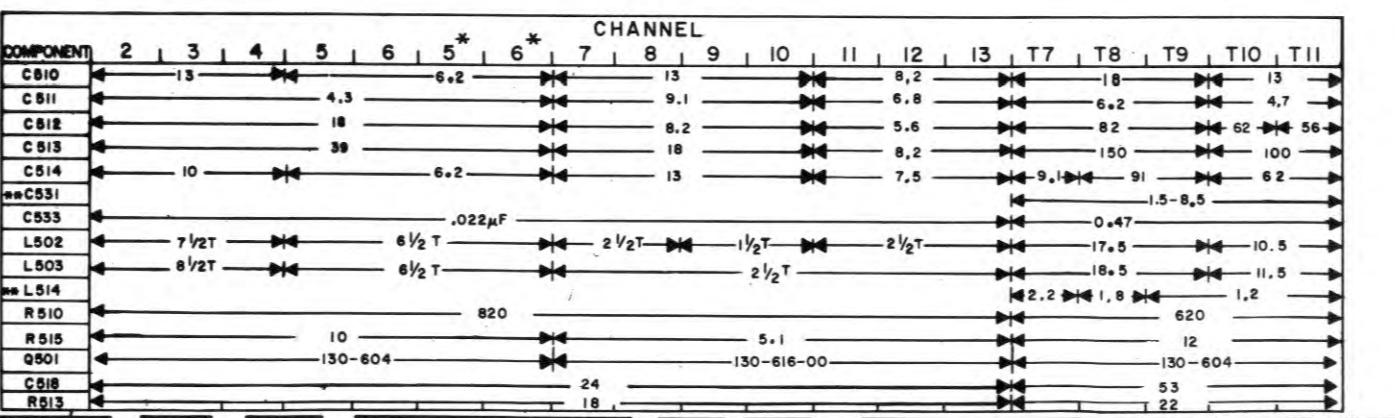


### REPLACEMENT PARTS LIST

MODEL CIC CONVERTER, 2-6, 7-13	
ASSEMBLY No. 822-728-00 DRAWING No. 863-489	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
CAPACITORS C501, C502, C506, C507, C508, C509, C516, C522, C523, C524, C525, C526, C527, C528, C529, C530, C534, C535	S124-078
C503	122-085
C504	124-139-00
C505	124-087-00
C515, C517	122-066
C518	126-188
C519	S126-230-57
C520	S126-230-55
C521	S126-230-09
C532	126-230-33
DIODES CR501, CR502 CR503, CR504, CR505, CR506	S137-309 137-840
JUMPER P501	184-103-00
RESISTORS R501 R502, R504 R503 R505 R506, R507 R508 R509 R511 R512 R513 R514 R516 R517 R518 R519 R520	112-994 112-929 112-064 112-104 112-954 112-950 112-919 112-936 112-099 112-082 112-078 112-980 111-005 112-079 112-100 112-920
TRANSFORMERS T501, T504 T502, T503 T505, T506	B144-734-00 B144-735-00 B144-350
TRANSISTOR Q502	S130-265-01

MODEL CIC CONVERTER, 2-6, 5* 6*	
ASSEMBLY No. 822-748 DRAWING No. 863-489	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
CAPACITORS C501-2, 3, 4 C510-5, 6, 5*, 6*	124-115 124-139
C511	124-087
C512	124-079
C513	124-126
C514-2, 3, 4 C514-5, 6, 5*, 6*	124-137 124-139
C535	124-214
RESISTORS R510 R515	112-976 112-077
TRANSISTOR Q501	130-604

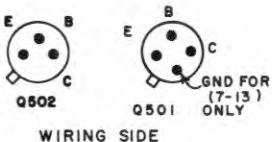
MODEL CIC CONVERTER, T7-T11	
ASSEMBLY No. 822-780 DRAWING No. 863-489	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
CAPACITORS C501, C502, C506, C507, C508, C509, C516, C522, C523, C524, C525, C526, C527, C528, C529, C530, C534, C535	S124-078
C503	122-085
C504	124-139
C505	124-087
C510-T7, T8, T9	124-079
C510-T10, T11	124-115
C511-T7, T8, T9	124-139
C511-T10, T11	124-061-00
C512-T7, T8, T9	S126-230-57
C512-T10	S126-230-35
C512-T11	124-138
C513-T7, T8, T9	126-088
C513-T10, T11	S126-230-73
C514-T7	124-108-00
C514-T8, T9	S126-230-64
C514-T10, T11	S126-230-35
C515, C517	122-066
C518	S126-230-26
C519	S126-230-57
C520	S126-230-55
C521	S126-230-09
C531	128-572
C533	124-066
DIODES CR501, CR502 CR503, CR504, CR505, CR506	S137-309 137-840
JUMPER P501	184-103-00
RESISTORS R501 R502, R504 R503 R505 R506, R507 R508 R509 R511 R512 R513 R514 R516 R517 R518 R519 R520	112-994 112-929 112-064 112-104 112-954 112-950 112-919 112-936 112-099 112-082 112-078 112-980 111-005 112-079 112-100 112-920
TRANSISTOR Q501	130-616-00



822 - SEE TABULATION

DESIG.	LAST NO. USED	NUMBER NOT USED	DESIG.	LAST NO. USED	NUMBER NOT USED
C	C535		T	T506	
CR	CR506		L	L515	
J	J505		TP	TP502	
P	P505		E	E503	
Q	Q502				
R	R520				

ASS'Y NO.	CHANNEL
822-748	2-6 5* 6*
822-749	7-13
822-780	T7-T11
822-728	SUB-ASS'Y

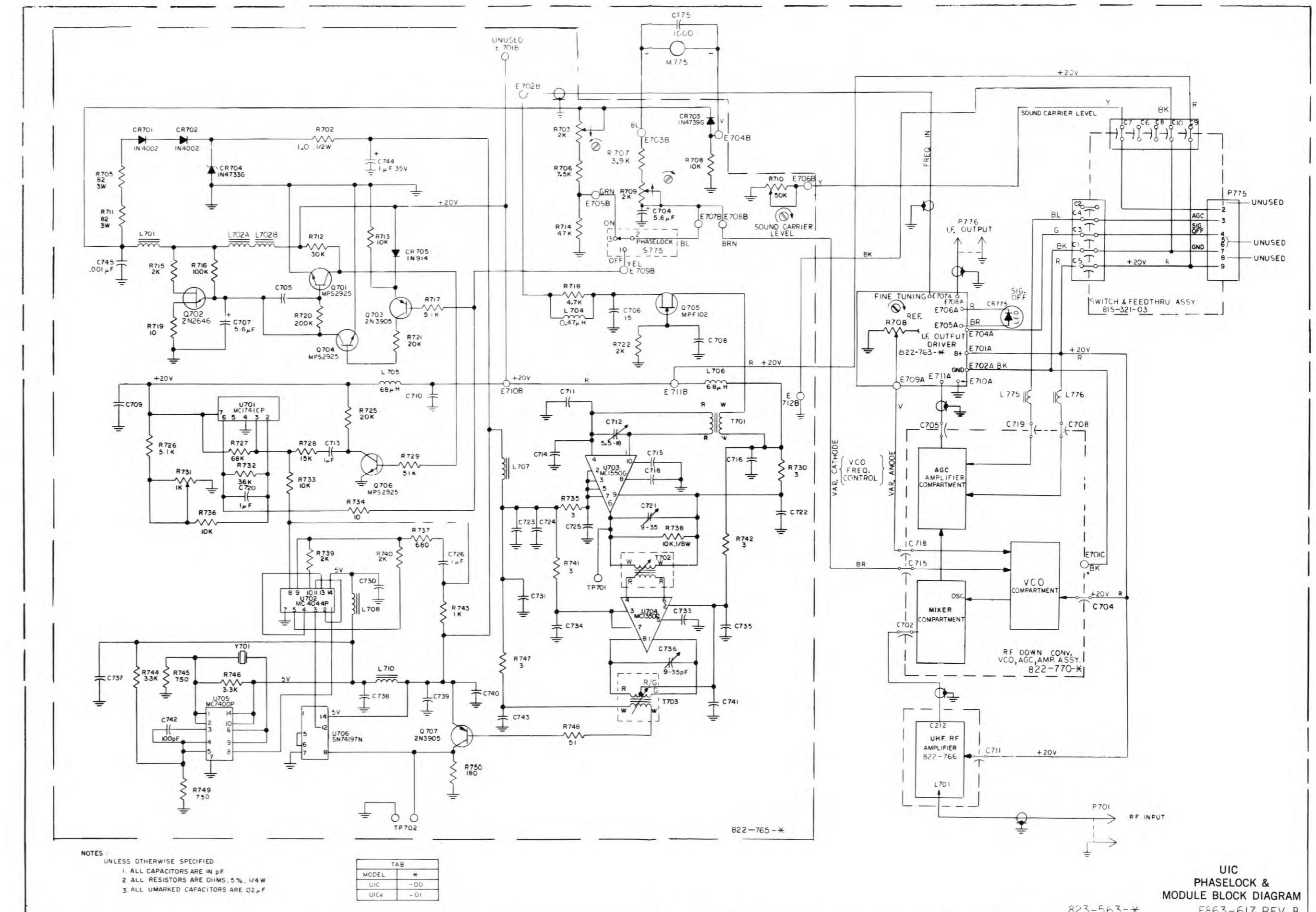


WIRING SIDE

NOTES:  
UNLESS OTHERWISE SPECIFIED  
1. ALL RESISTORS ARE IN OHMS, 5%, 1/4 W.  
2. ALL CAPACITORS ARE IN pF.  
3. ALL UNMARKED CAPACITORS ARE .02 pF.  
4. ALL INDUCTORS ARE IN μH.  
5. \*\* INDICATES T CH. ONLY.  
6. + DELETE FOR T CH.  
7. \* SEE CHANNEL CHART

### REPLACEMENT PARTS LIST

MODEL UIC	
ASSEMBLY No. 822-765-00	
DRAWING No. 863-617	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
CAPACITORS C704, C707 C705, C708, C709, C710, C711, C714, C715, C716, C718, C722, C723, C724, C725, C730, C731, C733, C734, C735, C737, C738, C739, C740, C741, C743	127-328 S124-078-00
C706 C712 C713, C720, C726 C721, C736	126-125-00 128-566-00 S124-188 128-565-00
C742 C744 C745 C775	126-091 127-316 124-049 124-077
CRYSTAL Y701	S139-280-00
DIODES CR701, CR702 CR703 CR704 CR705	S137-686 S137-830 137-805 139-169
INTEGRATED CIRCUIT U701 U702 U703 U704 U705 U706	134-506-00 134-505-00 130-223-00 134-013-00 134-504-00 134-507-00
LED CR775	102-026-00
METER M775	S171-232
RESISTORS R702 R703, R709 R705, R711 R706 R707 R708, R713, R733, R736 R710 R712 R714 R715, R722, R739, R740	111-056 S118-407-02 113-187 112-980 112-979 112-949-00 118-253-00 111-050 111-004 112-930
MODEL SWITCH AND FEED THRU ASSEMBLY	
ASSEMBLY No. 815-321-03	
DRAWING No. 863-617	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
CAPACITORS C1, C2, C3, C4, C5, C6, C7, C8, C9, C10	129-120



REPLACEMENT PARTS LIST

MODEL UIC AGC CONTROLLED PRE-AMP MIXER COMP.	
ASSEMBLY No. 822-764	
DRAWING No. 863-616	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERRLD PART No.
CAPACITORS C707, C713, C721 C721	124-077 124-058
DIODES CR706 CR707	137-805 S137-309
RESISTORS R705 R706 R708 R710 R711 R713	111-094-00 111-110-00 111-112-00 112-976 112-920 111-111-00

MODEL UIC RF DOWN CONVERTER VCO, AGC AMPLIFIER

ASSEMBLY No. 815-328

DRAWING No. 863-616

SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS

JERRLD PART No.

DIODES  
CR701, CR702, CR703, CR704

TRANSFORMERS

T701  
T702  
T703  
T704

B139-258

MODEL UIC RF DOWN CONVERTER VCO, AGC AMPLIFIER

ASSEMBLY No. 822-770

DRAWING No. 863-616

SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS

JERRLD PART No.

CAPACITORS  
C701  
C702, C705, C717, C719  
C704, C709, C715, C718

TRANSFORMERS

T706  
T708  
T710  
T711

129-202  
701-105  
129-120-00  
124-340-00  
129-200-00  
112-101  
124-342-00  
124-341-00  
128-590-00  
124-343-00

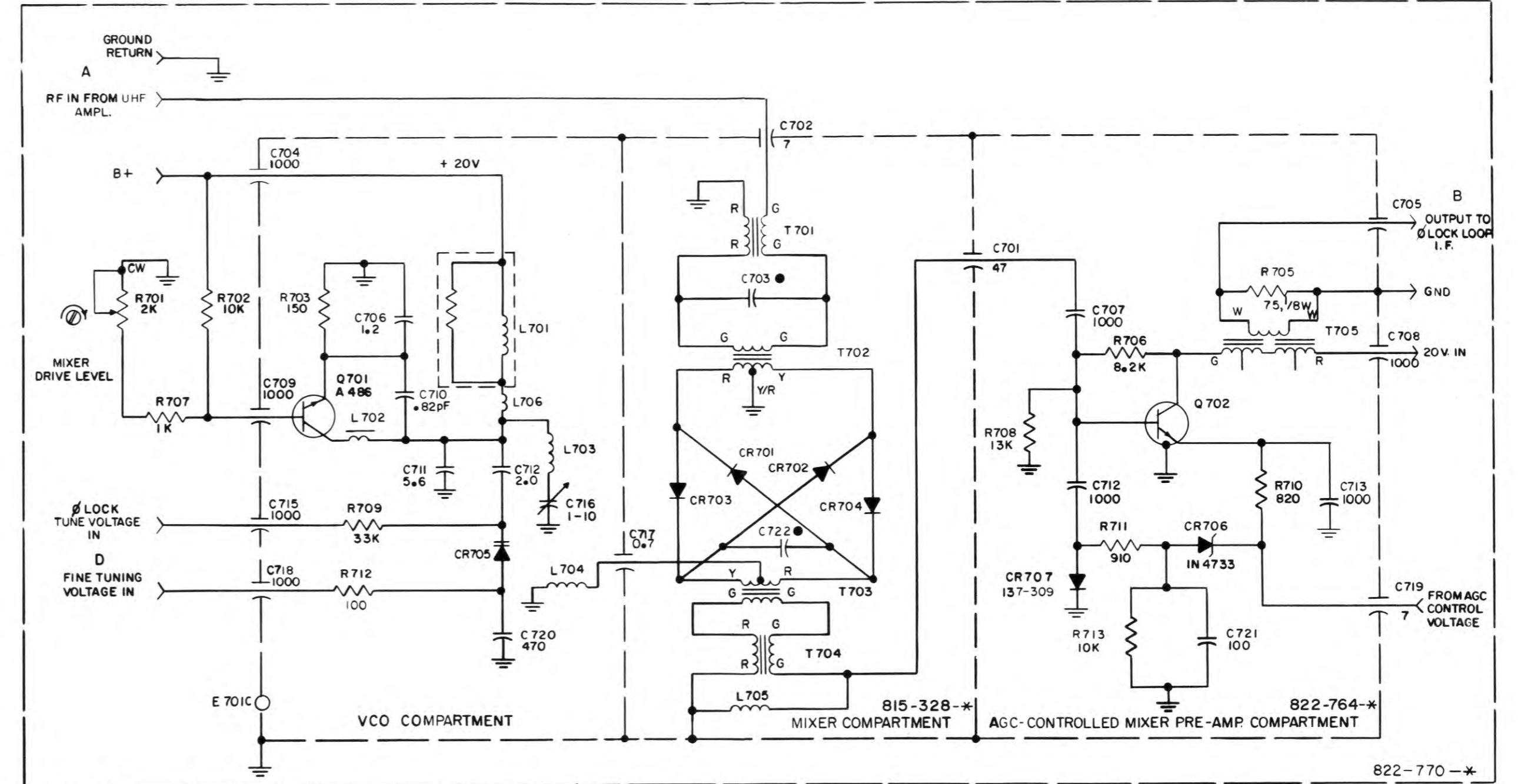
137-307

DIODE  
CR705

RESISTORS  
R701  
R702  
R703  
R707  
R709  
R710  
R712

118-407-02  
112-949  
112-974  
112-977  
111-003  
112-950

130-251

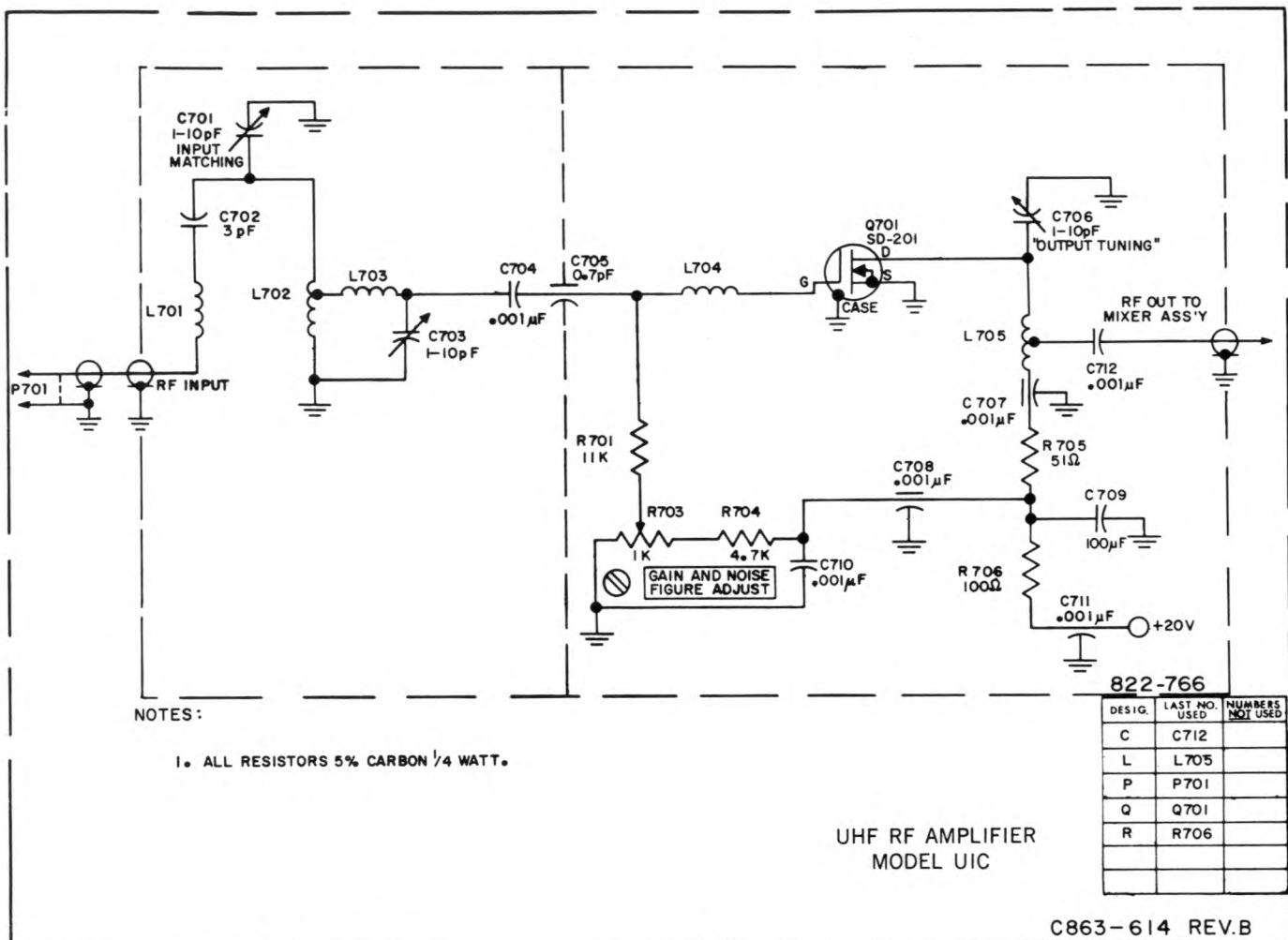


NOTES:

UNLESS OTHERWISE SPECIFIED

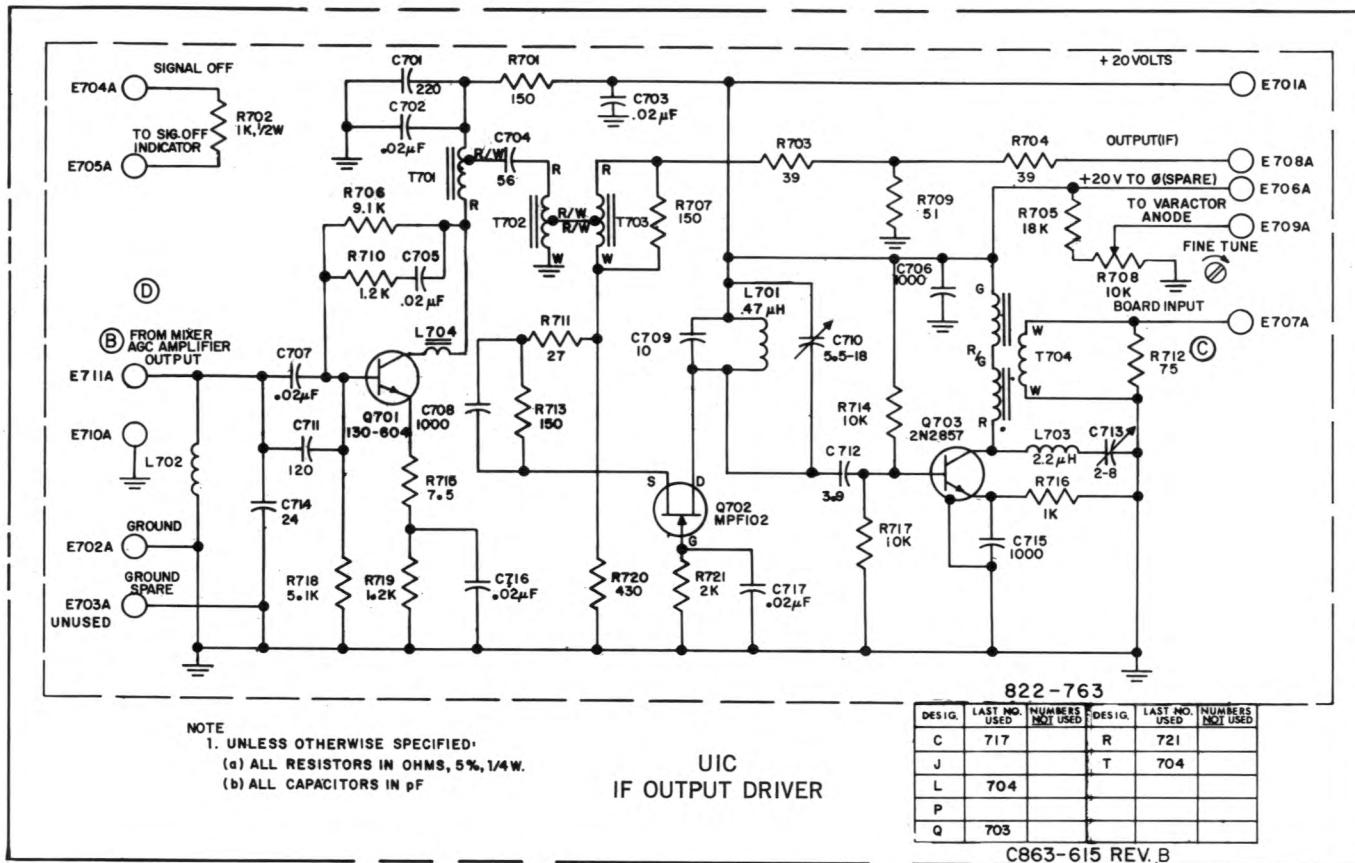
1. ALL RESISTORS ARE IN OHMS, 5%, 1/4W.
2. ALL CAPACITORS ARE IN pF.
3. CAPACITORS MARKED ● (C703 & C722), ARE COPPER RUNS ON CIRCUIT BOARD.

TAB	
MODEL	*
UIC	-00
UICe	-01



### REPLACEMENT PARTS LIST

MODEL UIC, UHF, RF AMPLIFIER	
ASSEMBLY No. 822-766-00	
DRAWING No. 863-614	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART NO.
CAPACITORS	
C701, C703, C706	128-590-00
C702	122-066
C704, C710, C712	124-077
C705, C711	129-199
C707, C708	129-200
C709	127-315-15
RESISTORS	
R701	112-988
R703	118-136
R704	111-001
R705	112-087
R706	112-950
TRANSISTOR	
Q701	130-623-00



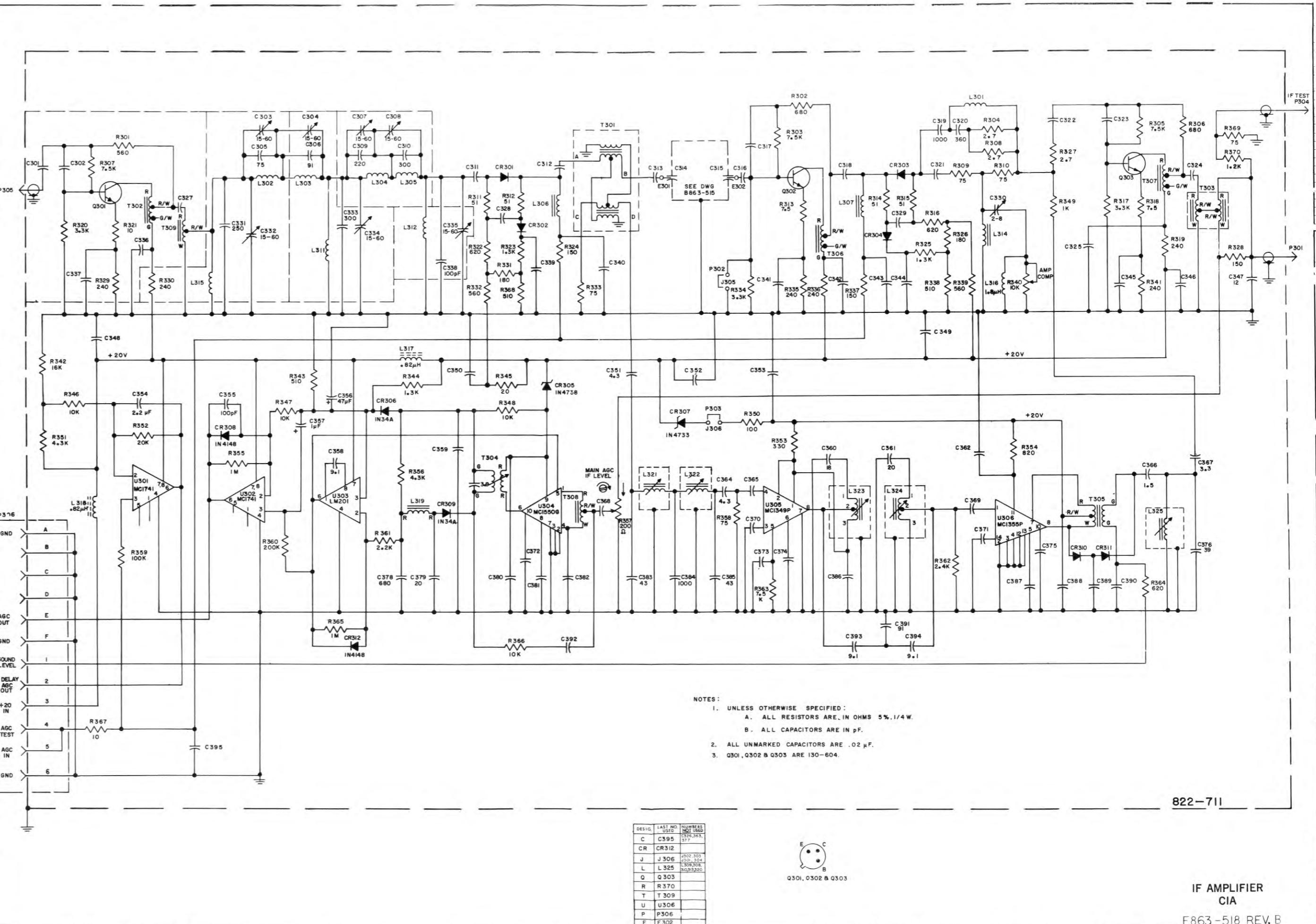
### REPLACEMENT PARTS LIST

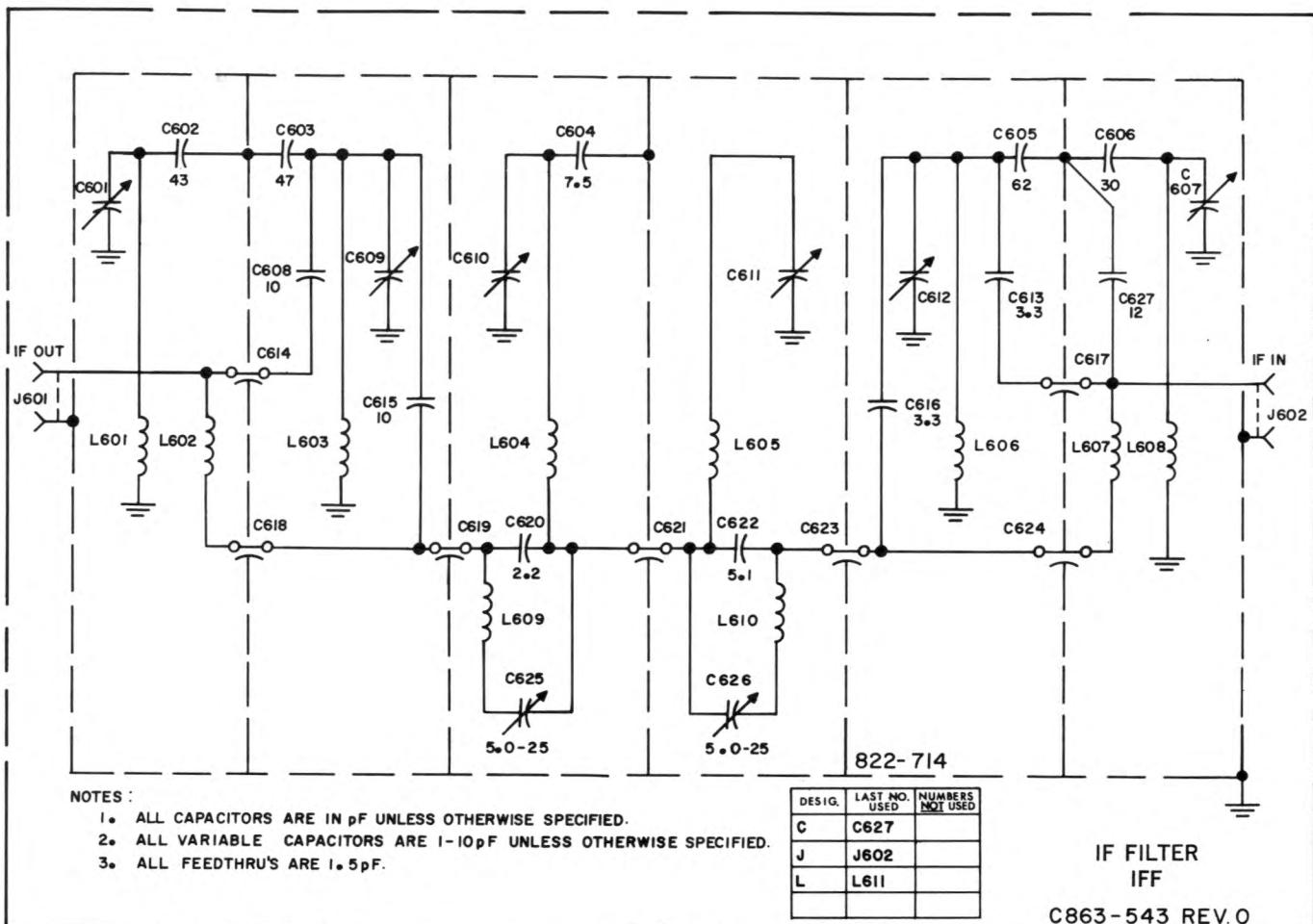
MODEL UIC IF OUTPUT DRIVER	
ASSEMBLY No. 822-763-00	
DRAWING No. 863-615	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART NO.
<b>CAPACITORS</b>	
C701	124-037
C702, C703, C705, C707,	S124-078-00
C716, C717	
C704	126-104
C706, C708, C715	S123-115
C709	126-188
C710	128-568
C711	124-053-00
C712	124-086-00
C713	S128-546-01
C714	126-188
<b>RESISTORS</b>	
R701, R707, R713	112-974
R702	112-359
R703, R704	112-983
R705	112-991
R706	112-987
R708	118-416

MODEL UIC IF OUTPUT DRIVER	
ASSEMBLY No. 822-763-00	
DRAWING No. 863-615	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART NO.
R709	112-087
R710, R719	112-921
R711	112-085
R712	112-954
R714, R717	112-949
R715	112-074
R716	112-977
R718	112-980
R720	112-100
R721	112-930
<b>TRANSFORMERS</b>	
T701	B144-461
T702	B144-458
T703	B144-461
T704	B144-733
<b>TRANSISTORS</b>	
Q701	130-604
Q702	130-214-00
Q703	130-267

REPLACEMENT PARTS LIST

MODEL CIA	
ASSEMBLY No. 822-711	
DRAWING No. 863-518	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART NO.
CAPACITORS	
C301, C302, C311, C312, C313, C323, C317, C318, C321, C322, C323, C324, C325, C327, C328, C329, C336, C337, C339, C340, C341, C342, C343, C344, C345, C346, C348, C349, C350, C352, C353, C359, C362, C365, C368, C369, C370, C371, C372, C373, C374, C375, C380, C381, C382, C386, C387, C388, C389, C390, C392, C395 C303, C304, C307, C308, C332, C334, C335	128-224
C305	126-100
C306, C391	124-156
C309	126-122
C310, C333	126-113
C319, C384	126-034
C320	127-316
C330	128-546
C331	126-111
C338	126-091
C347, C364	124-102-00
C351, C364	124-087-00
C354	124-373-00
C355	124-042
C356	127-330-00
C357	127-316
C358, C393, C394	124-108-00
C361, C379	124-119-00
C366	124-157-00
C367	124-113-00
C376	124-126-00
C378	126-081
C383, C385	126-101
DIODES	
CR301, CR302, CR303, CR304, CR310, CR311	\$137-309
CR305	137-808
CR306, CR309	139-261
CR307	137-805
CR308, CR312	137-824
INTEGRATED CIRCUITS	
U301, U302	134-506-00
U303	134-514-00
U304	130-223
TRANSISTORS	
Q301, Q302, Q303	130-604



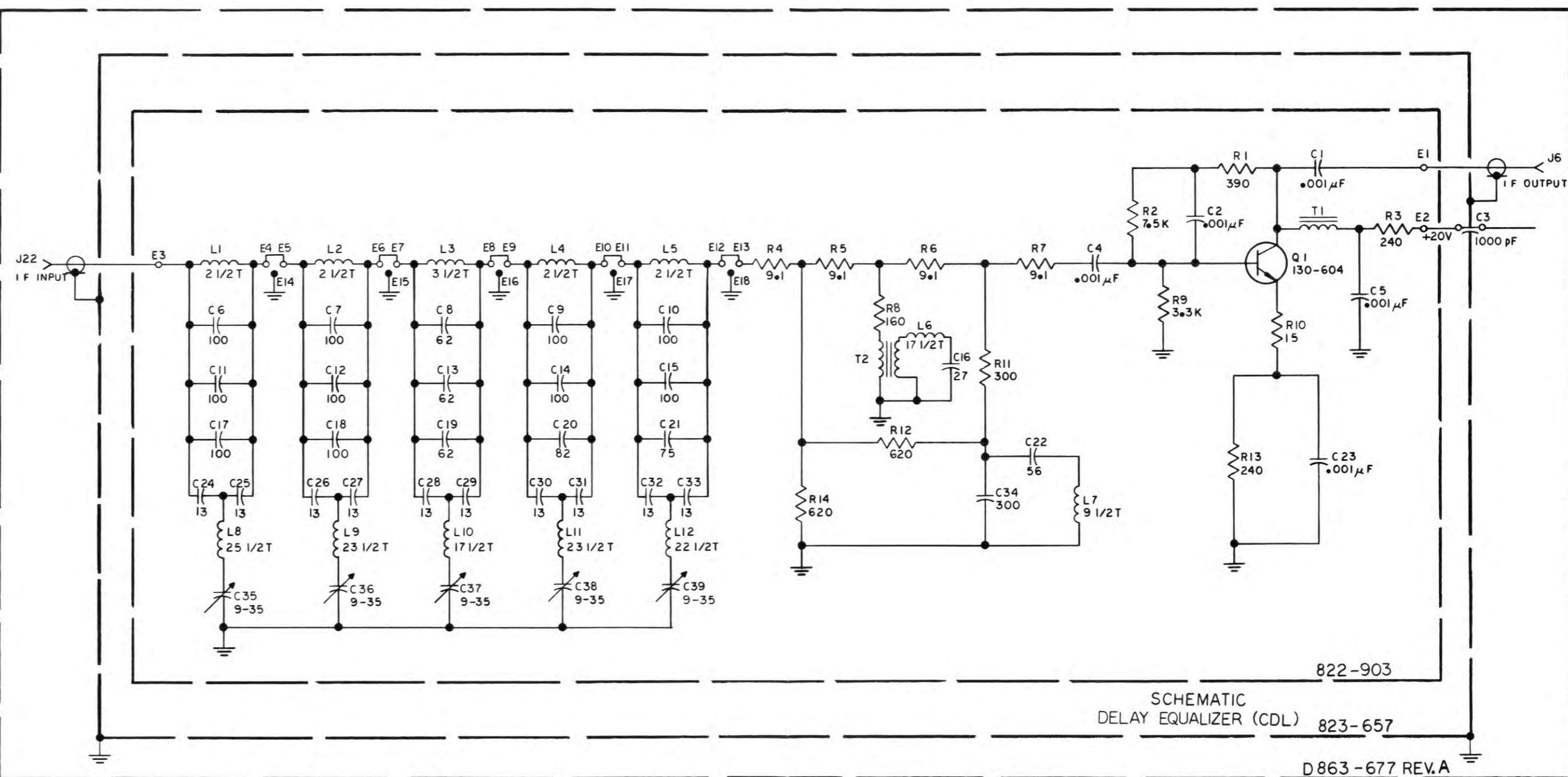


### REPLACEMENT PARTS LIST

MODEL IF FILTER	
ASSEMBLY No. 822-714-00	
DRAWING No. 863-543	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
CAPACITORS	
C601, C607, C609, C610, C611, C612	128-590
C602	126-101
C603	124-122
C604	124-072
C605	126-107
C606	124-121
C608, C615	124-137
C613, C616	124-113
C614, C617, C618, C619, C621, 623, 624	129-204
C620	124-084
C622	124-127
C625, C626	128-239
C627	124-102

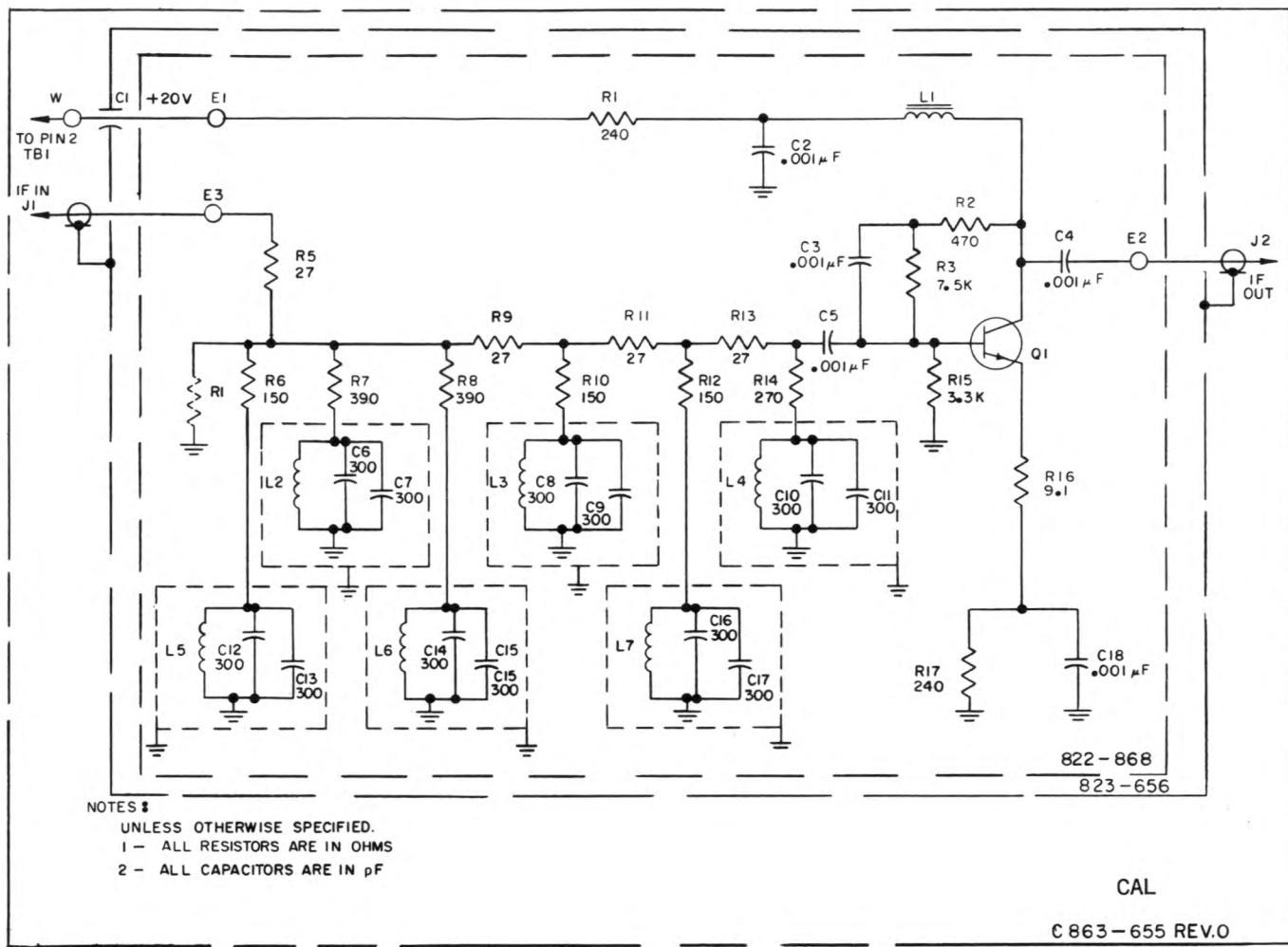
## **REPLACEMENT PARTS LIST**

MODEL CDL	
ASSEMBLY No. 822-903	
DRAWING No. 863-677	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERRLD PART NO.
CAPACITORS	
C2, C4, C5, C23	124-049
C7, C9, C10, C11, C12, C14, C17, C18	129-200-00
C13, C19	\$126-230-73
	\$126-230-35
	\$126-230-55
	\$126-230-48
	126-104
C25, C26, C27, C28, C29,	126-229-02
C31, C32, C33	
	126-113
	128-565
RESISTORS	
R13	112-099
R5, R6, R7	112-986
	112-975
	112-076
	112-094
	112-936
	112-973
	112-096
	112-998
TRANSFORMERS	
	B144-774
	B144-777
TRANSISTORS	
	130-604



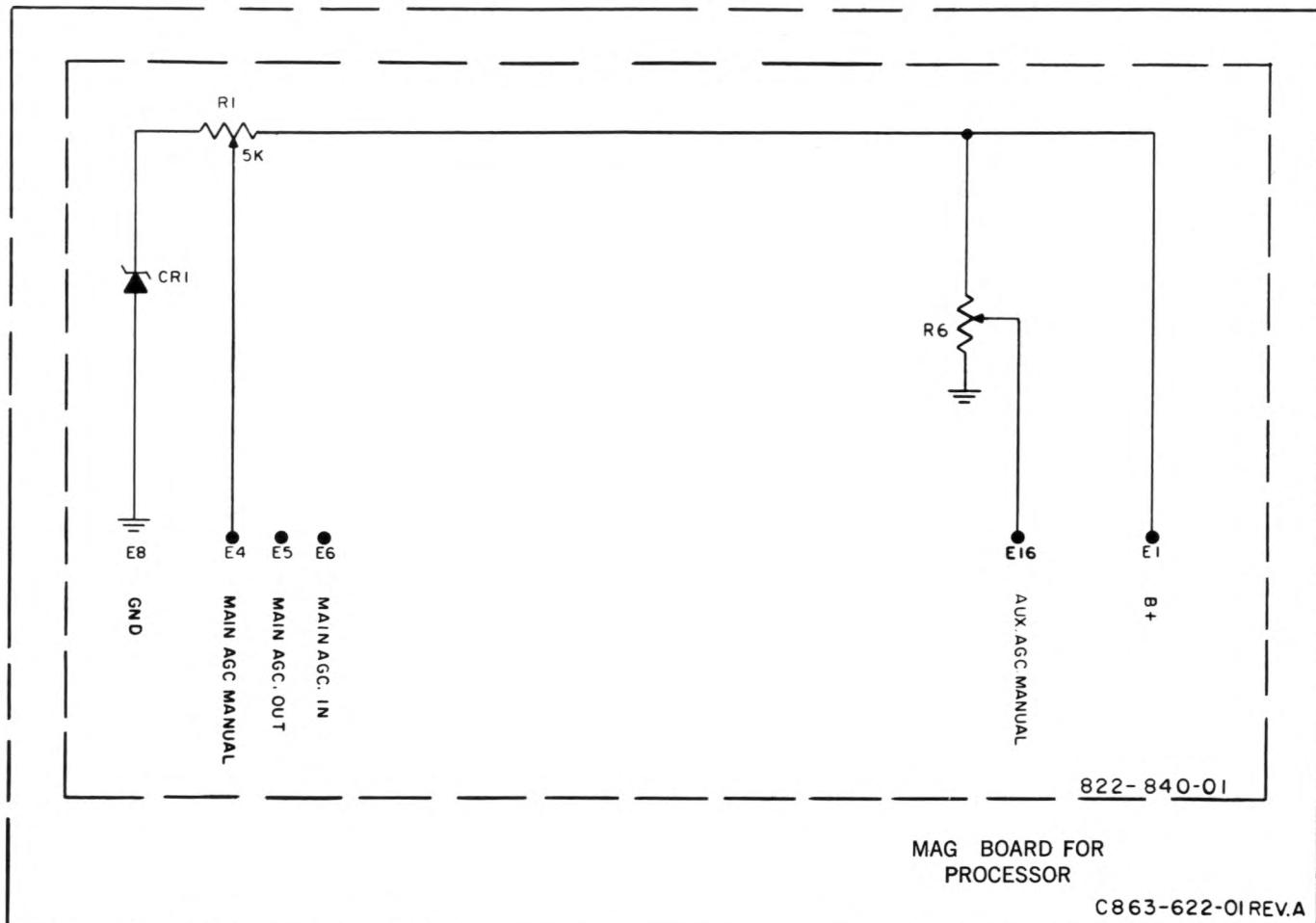
NOTES:  
UNLESS OTHERWISE SPECIFIED:  
1. ALL RESISTORS ARE IN OHM  
2. ALL CAPACITORS ARE IN pF.  
3. ALL INDUCTORS ARE IN  $\mu$ H.

DESIG.	LAST NO. USED	NUMBERS NOT USED
C	C39	
E	E18	
J	J22	J1106 W71021
L	L12	
Q	Q1	
R	R14	
T	T2	



### REPLACEMENT PARTS LIST

MODEL CAL	
ASSEMBLY No. 822-868	
DRAWING No. 863-655	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
CAPACITORS C2, C3, C4, C5, C18 C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17	124-049 126-113
RESISTORS R1, R17 R2 R3 R5, R9, R11, R13 R6, R10, R12 R7, R8 R14 R15 R16	112-975 112-101 112-986 112-085 112-974 112-099 112-993 112-936 112-073
TRANSISTOR Q1	130-604

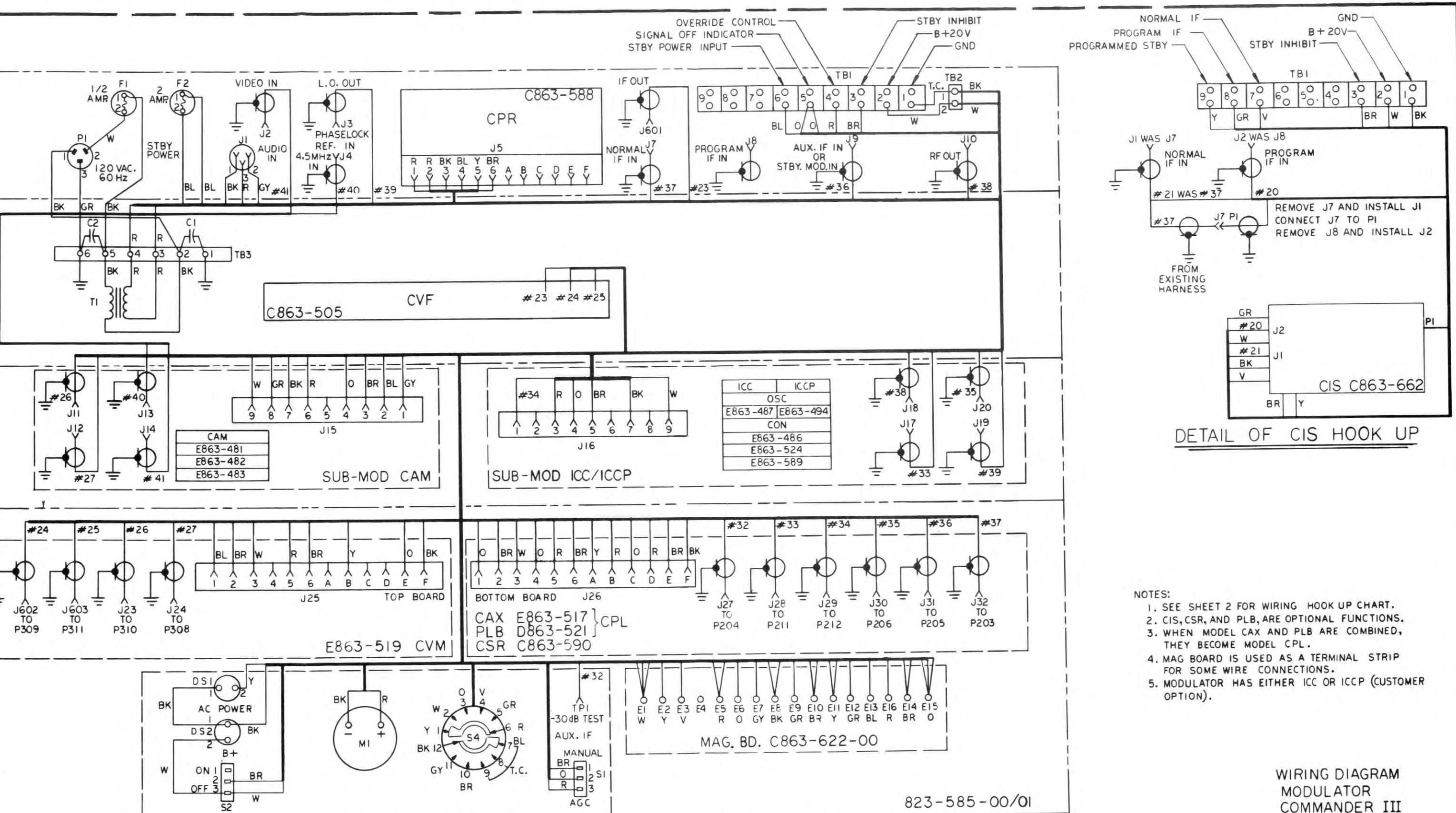


### REPLACEMENT PARTS LIST

MAG BOARD FOR PROCESSOR	
ASSEMBLY No. 822-840-01	
DRAWING No. 863-622—Sheet 2	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART NO.
DIODE CR1	137-806
RESISTORS R1, R6	118-254-00

### REPLACEMENT PARTS LIST

MODEL MMF	
ASSEMBLY No. 812-407	
DRAWING No. 862-110	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
CAPACITORS C1, C2	124-032
FUSES F1 F2	101-335 101-352
FUSE HOLDERS F1, F2	101-811
LAMPS DS1 (Amber) DS2 (Green)	102-302 102-303
METER M1	C171-234-01
SWITCHES S1, S2 S4	162-045 C161-163
TRANSFORMER T1	C141-309-00



FROM	TO	REMARKS
P1 PIN 1	TB3 TERM 2	BK LINE CORD
P1 PIN 2	F1 TERM 2	W LINE CORD
P1 PIN 3	TB3 TERM 6	GR LINE CORD
F1 TERM 1	TB3 TERM 5	BK #22 WIRE
F2 TERM 1	J5 PIN 4 OR TB1 PIN 6	BL #22 WIRE
F2 TERM 2	TB1 PIN 6	BL #22 WIRE
TB3 TERM 1	TB3 TERM 2	C1,.01μF,1000VDC
TB3 TERM 2	T1 PRIMARY	BK #22 WIRE
TB3 TERM 3	T1 SECONDARY	R #22 WIRE
TB3 TERM 3	J5 TERM 1 OR J5 TERM 2	R #22 WIRE
TB3 TERM 4	J5 TERM 2	R #22 WIRE
TB3 TERM 4	T1 SECONDARY	R #22 WIRE
TB3 TERM 5	TB3 TERM 6	C2,.01μF,1000VDC
TB3 TERM 5	T1 PRIMARY	BK #22 WIRE
J1 PIN 1	TB2 TERM 1	BK#22 WIRE
J1 PIN 2	J15 PIN 1	GY#22 WIRE
J1 PIN 3	J15 PIN 6	R #22 WIRE
J2	J14	COAXIAL#41
J3	J19	COAXIAL#39
J4	J13	COAXIAL#40
J5 PIN 3	TB2 TERM 1	BK #22 WIRE
J5 PIN 5	DS1 PIN 2	Y #22 WIRE
J5 PIN 6	S2 TERM 2	BR #22 WIRE
J5 PIN ATOF		NOT CONNECTED
J601	CVF BOX	COAXIAL #23
J7	J32	COAXIAL #37
J8		NOT CONNECTED
J9	J31	COAXIAL #36
J10	J18	COAXIAL #38
TB1 TERM 1	TB2 TERM 1	#22 T.C.

SEE NOTE 1

FROM	TO	REMARKS
TB1 TERM 2	TB2 PIN 2	W #22 WIRE
TB1 TERM 3	J26 PIN 6	BR #22 WIRE
TB1 TERM 4	J26 PIN D	R #22 WIRE
TB1 TERM 5	J26 PIN C	O #22 WIRE
TB1 TERM 5	J15 PIN 4	O #22 WIRE
TB1 TERM 7,8&9		NOT CONNECTED
TB2 TERM 1	J15 PIN 7	BK #22 WIRE
TB2 TERM 1	J16 PIN 7	BK #22 WIRE
TB2 TERM 1	J25 PIN F	BK #22 WIRE
TB2 TERM 1	J26 PIN F	BK #22 WIRE
TB2 TERM 1	E8	BK #22 WIRE
TB2 TERM 2	J15 PIN 9	W #22 WIRE
TB2 TERM 2	J16 PIN 9	W #22 WIRE
TB2 TERM 2	J25 PIN 3	W #22 WIRE
TB2 TERM 2	J26 PIN 3	W #22 WIRE
TB2 TERM 2	E1	W #22 WIRE
J11	J23	COAXIAL #26
J12	J24	COAXIAL #27
J15 PIN 1	J1 PIN 2	GY #22 WIRE
J15 PIN 2	J25 PIN 1	BL #22 WIRE
J15 PIN 3	J25 PIN 2	BR #22 WIRE
J15 PIN 5		NOT CONNECTED
J15 PIN 8	E12	GR #22 WIRE
J16 PIN 1	J29	COAXIAL #34
J16 PIN 2,6&8		NOT CONNECTED
J16 PIN 3	J26 PIN B	R #22 WIRE
J16 PIN 4	J26 PIN 1	O #22 WIRE
J16 PIN 5	J26 PIN 2	BR #22 WIRE
J17	J28	COAXIAL #33
J20	J30	COAXIAL #35

FROM	TO	REMARKS
J602	CVF BOX	COAXIAL #24
J603	CVF BOX	COAXIAL #25
J25 PIN 4,A,C&D		NOT CONNECTED
J25 PIN 5	E5	R #22 WIRE
J25 PIN 6	E10	BR #22 WIRE
J25 PIN B	E2	Y #22 WIRE
J25 PIN E	E6	O #22 WIRE
J26 PIN 4	E15	O #22 WIRE
J26 PIN 5	E5	R #22 WIRE
J26 PIN A	E11	Y #22 WIRE
J26 PIN E	E14	BR #22 WIRE
J27	TP1	COAXIAL #32
DS1 PIN 1	DS2 PIN 1	BK #22 WIRE
DS2 PIN 1	E8	BK #22 WIRE
DS2 PIN 2	S2 PIN 3	W #22 WIRE
S1 TERM 1	E14	BR #22 WIRE
S1 TERM 2	E15	O #22 WIRE
S1 TERM 3	E16	R #22 WIRE
S2 TERM 1		NOT CONNECTED
S2 TERM 3	E1	W #22 WIRE
S4 TERM 1-Φ LOCK	E11	Y #22 WIRE
S4 TERM 2- B+	E1	W #22 WIRE
S4 TERM 3- AGC	E15	O #22 WIRE
S4 TERM 4-VIDEO	E3	V #22 WIRE
S4 TERM 5-AUDIO	E9	GR #22 WIRE
S4 TERM 6- +	M1 +	R #22 WIRE
S4 TERM 7-Φ LOCK	E13	BL #22 WIRE
-B+		
S4 TERM 8-9-AGC	S4 TERM 7	#22 T.C.
S4 TERM 10-VIDEO	E10	BR #22 WIRE
S4 TERM 11-AUDIO	E7	GY #22 WIRE
S4 TERM 12- -	M1 -	BK #22 WIRE
E4		NOT CONNECTED

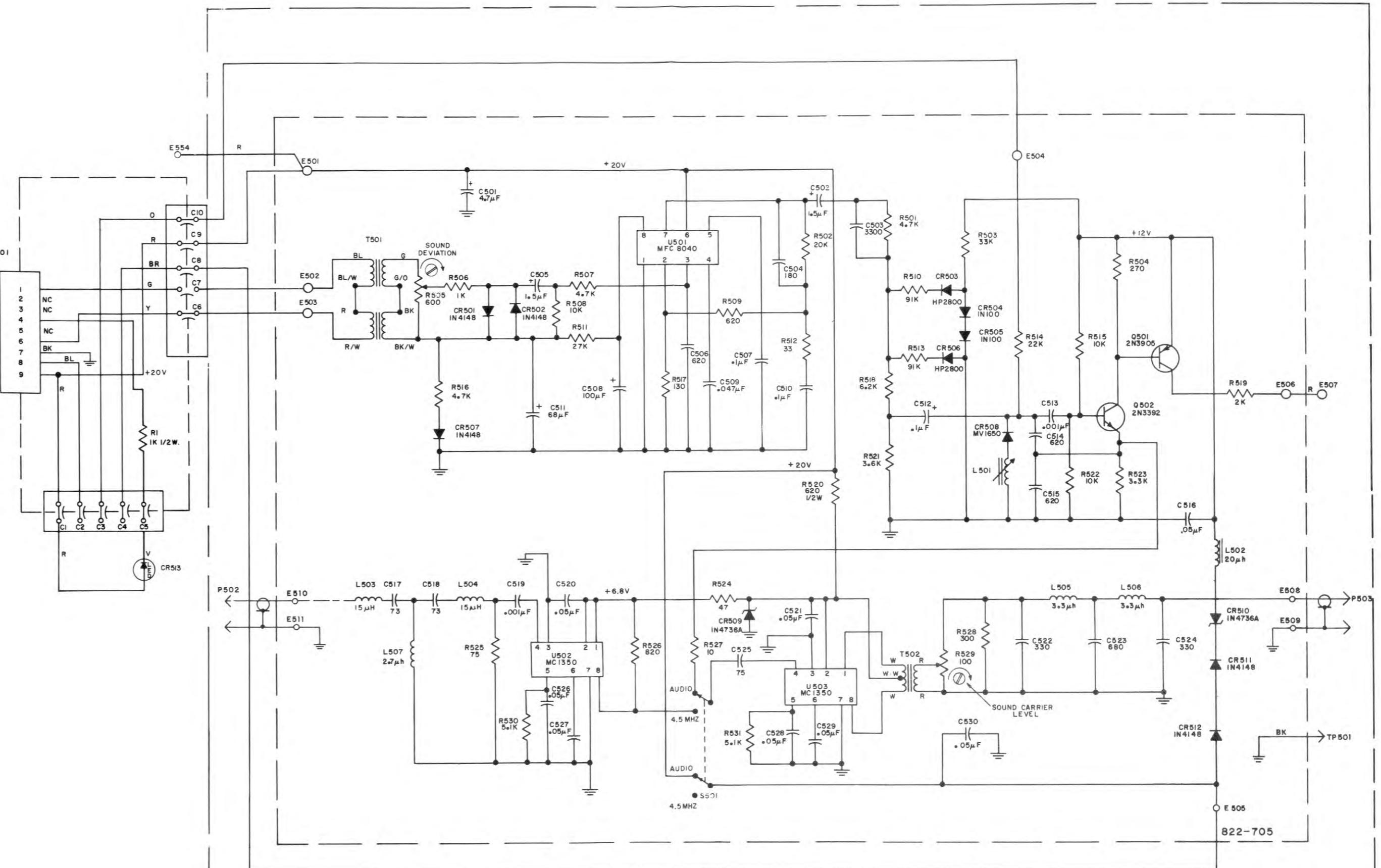
NOTE :

- 1.COAXIAL IDENTIFICATION NUMBER IS EQUIVALENT TO TAB NUMBER OF CABLE ASSEMBLY DRAWING D811-878 (EXAMPLE: #37=811-878-37).

### REPLACEMENT PARTS LIST

MODEL AUDIO MOD. (VCO)	
ASSEMBLY No. 822-705-00	
DRAWING No. 863-483	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
CAPACITORS	
C501	127-079
C502, C505	127-323
C503	124-181
C504	124-085
C506	124-146
C507	125-301
C508	127-060
C509	125-326
C510	125-337
C511	127-319
C512	127-316
C513, C519	124-049
C514, C515	126-169
C516, C520, C521, C526, C527,	124-150
C528, C529, C530	S118-251-00
C517, C518	126-114
C522, C524	126-081
C523	124-052
C525	
DIODES	
CR501, CR502, CR507, CR511,	
CR512	137-824
CR503, CR506	137-832
CR504, CR505	137-800
CR508	139-268
CR509, CR510	137-807
INTEGRATED CIRCUITS	
U501	134-030-00
U502, U503	134-013-00
RESISTORS	
R501, R507, R516	111-001
R502	111-033
R503	111-003
R504	112-993
R505	S118-250-00
R506	112-977
R508, R515, R522	112-949
R509	112-998
R510, R513	111-074
R511	111-031
MODEL AUDIO MOD. (VCO)	
ASSEMBLY No. 822-705-00	
DRAWING No. 863-483	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.

MODEL AUDIO MODULATOR	
ASSEMBLY No. 823-528-00	
DRAWING No. 863-483	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
CAPACITORS	
C1, C2, C3, C4, C5, C6, C7, C8, C9, C10	129-120
LED	
CR513	102-026-00



DESIG.	LAST NO. USED	NUMBERS NOT USED	DESIG.	LAST NO. USED	NUMBERS NOT USED
C C530			T T502		
CR CR513			U U503		
E E511			P P503		
L L507			S S501		
Q Q502			TP TP501		
R R531					

NOTES  
UNLESS OTHERWISE SPECIFIED:  
1. ALL RESISTORS ARE IN OHMS, 5%, 1/4 W.  
2. ALL CAPACITORS ARE IN pF.



AUDIO MOD.  
VCO

### REPLACEMENT PARTS LIST

#### FREQUENCY CONTROL

ASSEMBLY No. 822-706-00

DRAWING No. 863-482

SCHEMATIC DESIGNATIONS  
OR PART DESCRIPTIONS

JERROLD

PART NO.

##### CAPACITORS

C551	124-150
C552	126-179
C553	124-126
C554, C555	127-320
C556	127-313
C557, C559, C573	125-324
C558	124-179
C559, C565, C568	127-079
C560, C572	127-316
C561	128-563
C562, C563, C571	126-214
C564	125-326
C566, C567	126-081
C570	124-066

##### CRYSTAL

Y551	S139-283-00
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##### DIODES

CR551, CR552, CR554, CR555,	137-824
CR553	137-804

##### INTEGRATED CIRCUITS

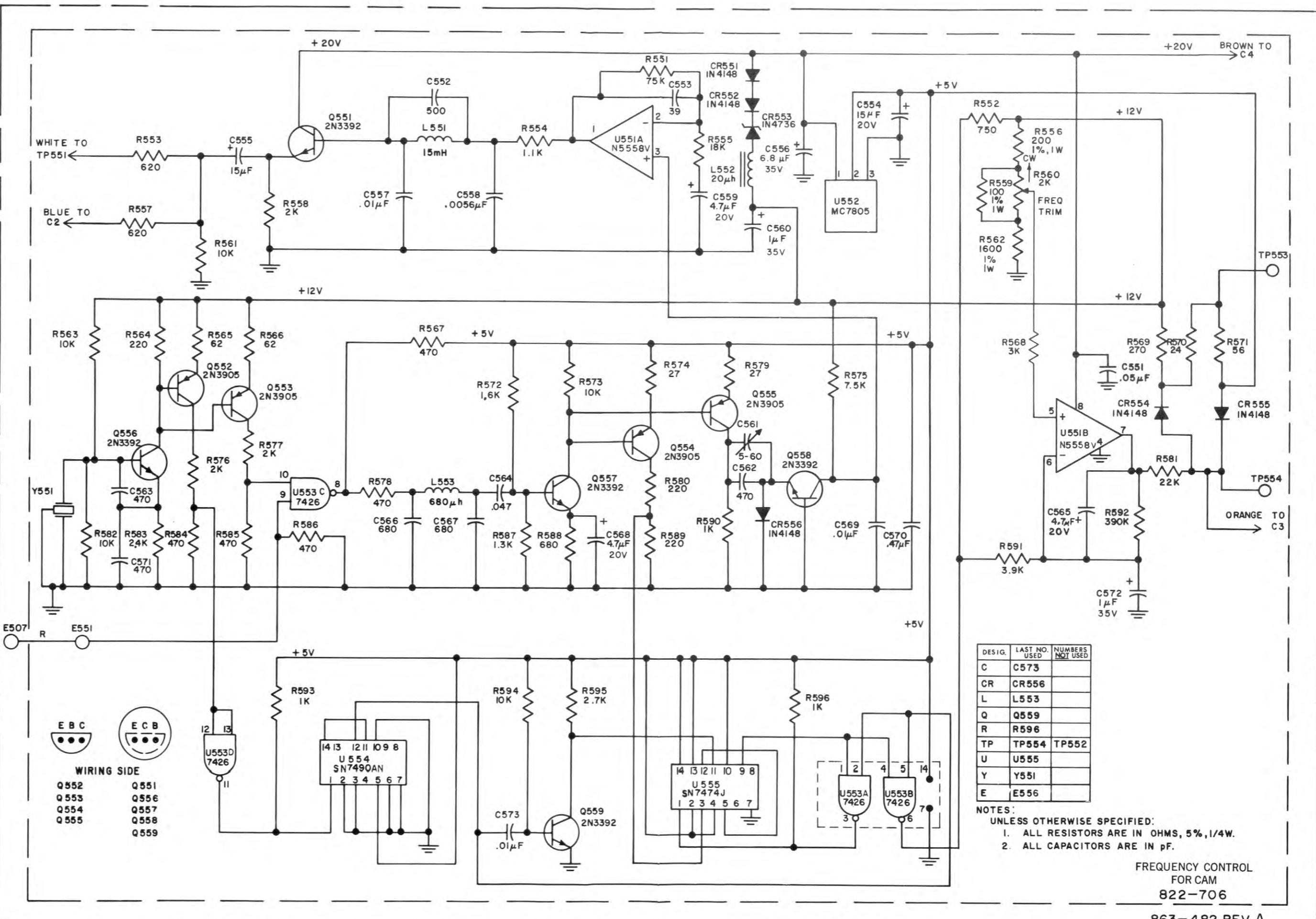
U551	134-012-00
U552	134-032-00
U553	134-031-00
U554	134-033-00
U555	134-034-00

##### RESISTORS

R551	111-034
R552	112-917
R553, R557	112-998
R554	112-927
R555	112-991
R556	113-224-00
R558, R576, R577	112-930
R559	113-222-00
R560	118-407-02
R561, R563, R573, R582, R594	112-949
R562	113-223-00
R564, R580, R589	112-095
R565, R566	112-089
R567, R578, R584, R585, R586	112-101
R568	112-934
R569	112-993
R570	112-985
R571	112-088
R572	111-012
R574, R579	112-085
R575	112-986
R581	111-015
R583	112-918
R587	112-064
R588	112-105
R590, R593, R596	112-977
R591	112-979
R592	111-732
R595	112-931

##### TRANSISTORS

Q551, Q556, Q557, Q558, Q559	130-166
Q552, Q553, Q554, Q555	B130-168



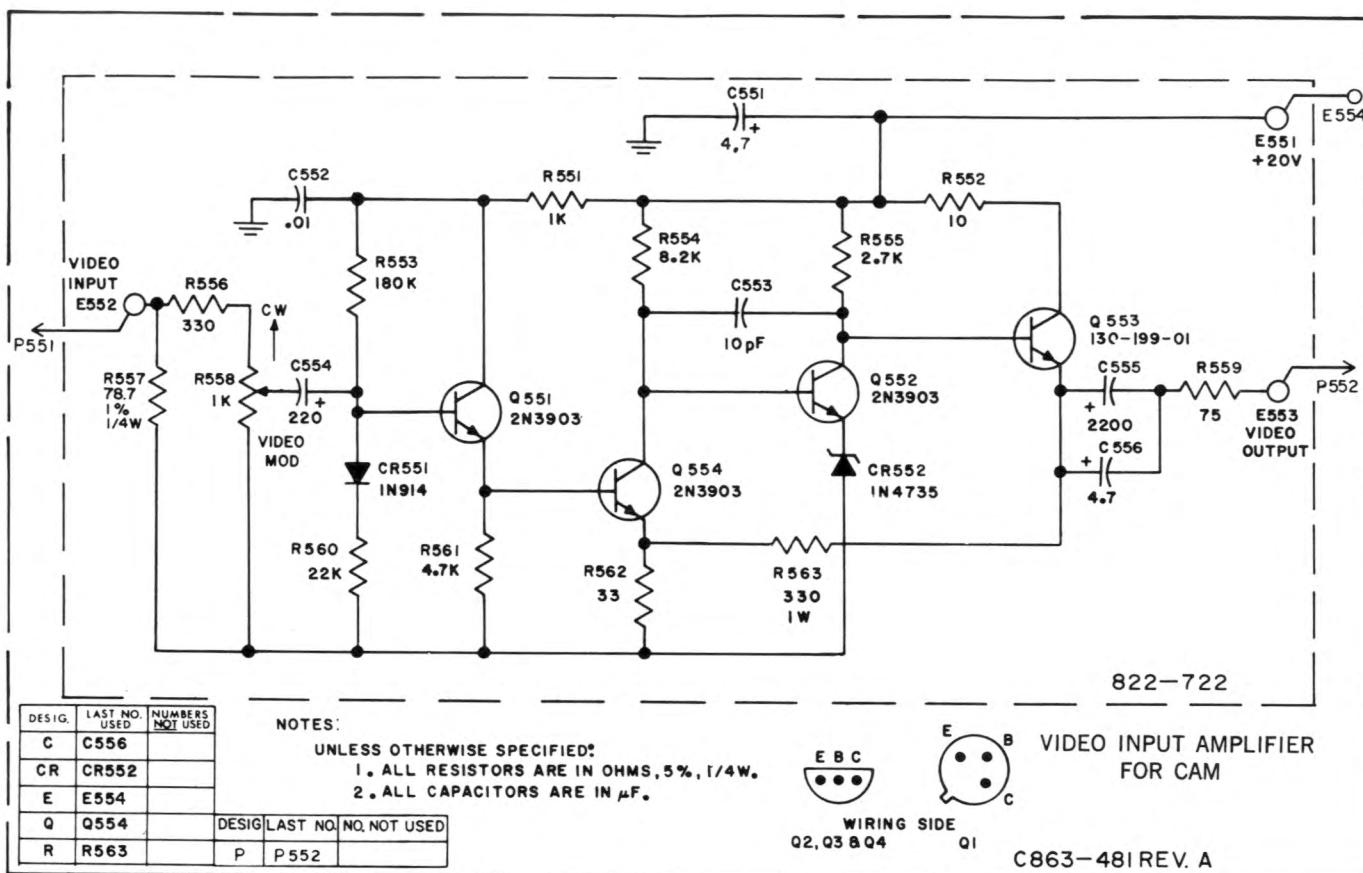
DESIG.	LAST NO. USED	NUMBERS NOT USED
C	C573	
CR	CR556	
L	L553	
Q	Q559	
R	R596	
TP	TP554	TP552
U	U555	
Y	Y551	
E	E556	

#### NOTES:

- UNLESS OTHERWISE SPECIFIED:
- 1. ALL RESISTORS ARE IN OHMS, 5%, 1/4W.
- 2. ALL CAPACITORS ARE IN pF.

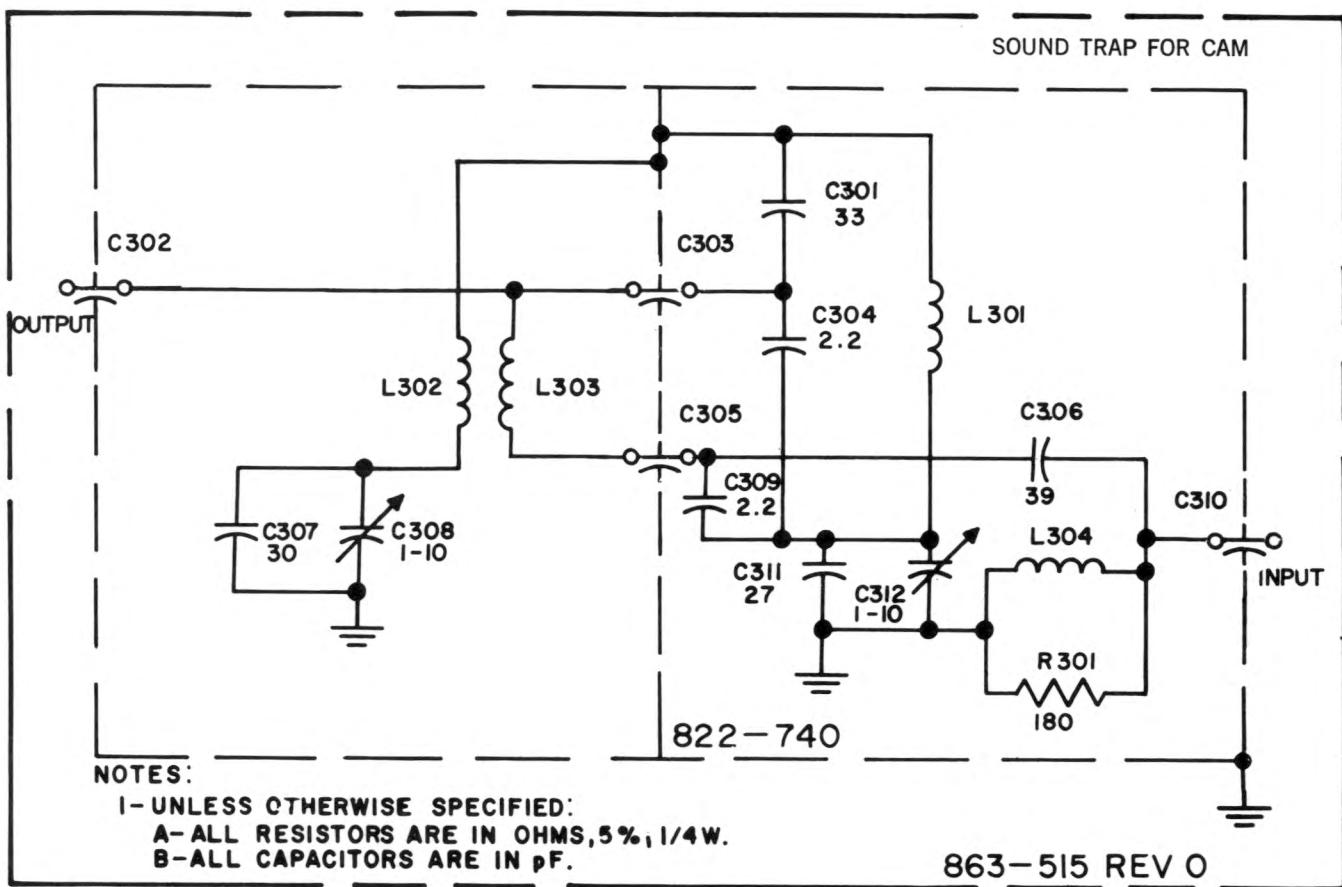
FREQUENCY CONTROL  
FOR CAM  
822-706

863-482 REV. A



## **REPLACEMENT PARTS LIST**

VIDEO INPUT AMPLIFIER FOR CAM	
ASSEMBLY No. 822-722	
DRAWING No. 863-481	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART NO.
CAPACITORS	
C551, C556	127-079
C552	124-076
C553	126-170
C554	127-062
C555	127-188
DIODES	
CR551	139-169
CR552	137-806
RESISTORS	
R551	112-977
R552	112-077
R553	111-036
R554	111-002
R555	112-931
R556	112-097
R557	115-326
R558	S118-249-00
R559	112-954
R560	111-015
R561	111-001
R562	112-995
R563	112-297
TRANSISTORS	
Q551, Q552, Q554	B130-187
Q553	S130-199-01



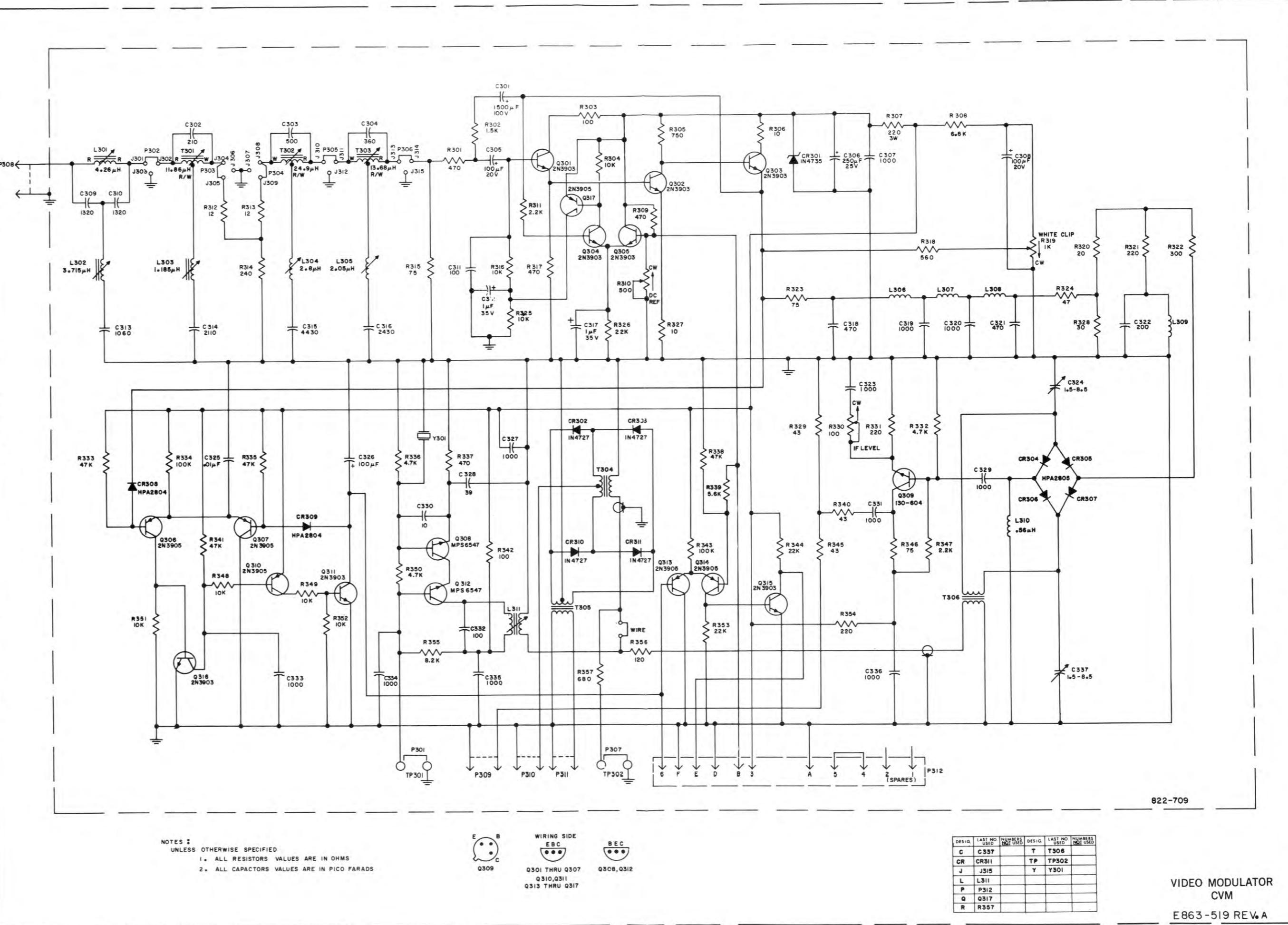
#### REPLACEMENT PARTS LIST

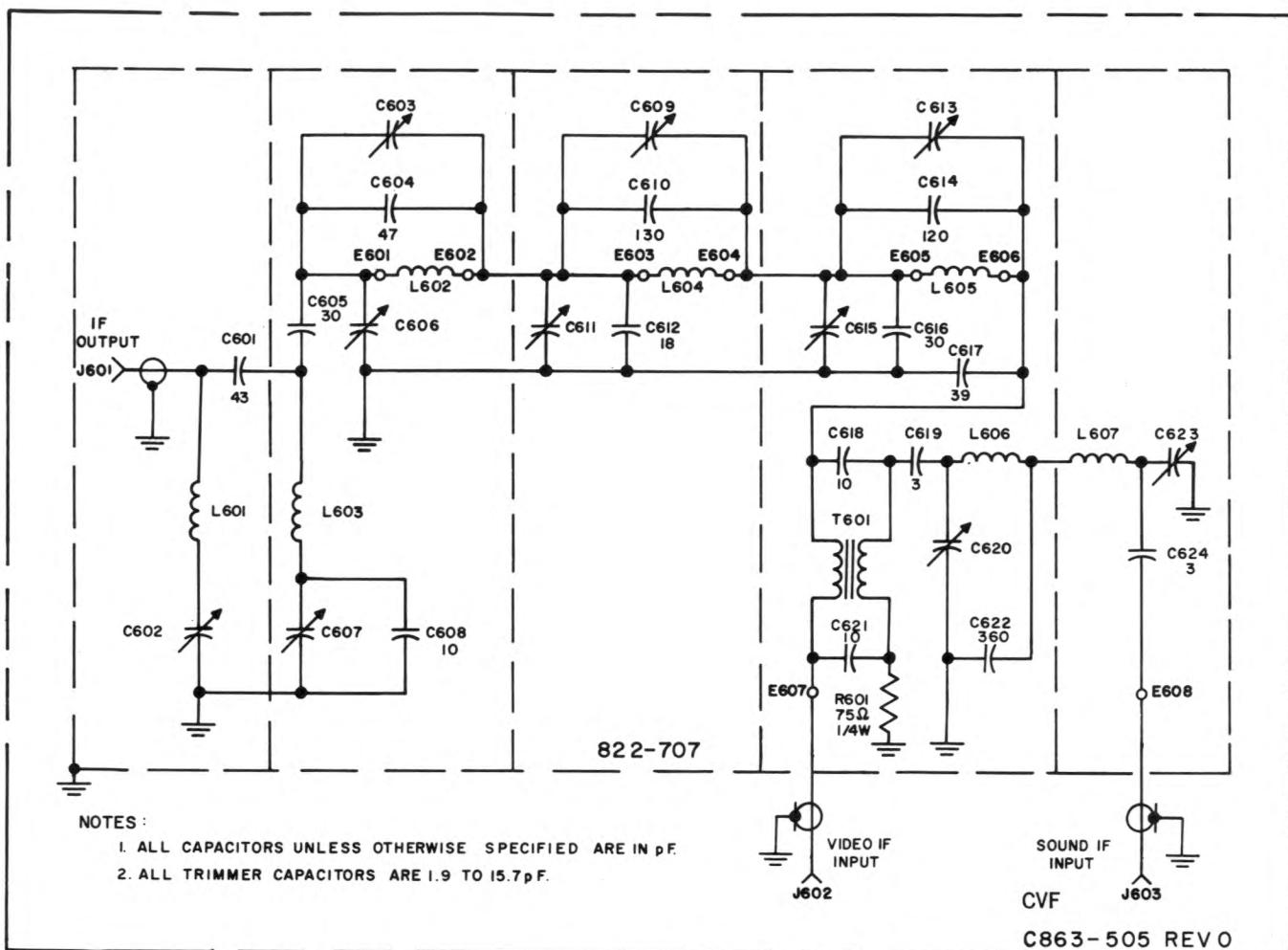
SOUND TRAP BOX	
ASSEMBLY No. 822-740-00	
DRAWING No. 863-515	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
CAPACITORS	
C301	124-125-00
C302, C310	129-203
C303, C305	129-204
C304, C309	124-064-00
C306	124-126-00
C307	124-121-00
C308, C312	128-590
C311	124-120-00
RESISTOR	
R301	112-994

## REPLACEMENT PARTS LIST

MODEL CVM	
ASSEMBLY No. 822-709-00	
DRAWING No. 863-519	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
CAPACITORS	
C301	127-073
C302	126-272
C303	126-274
C304	126-273
C305, C308, C326	127-315-15
C306	127-062
C307, C323, C327, C329, C331, C333, C334, C335, C336	S123-115
C309, C310	126-276
C311, C332	126-091
C312, C317	127-316
C313	126-275
C314	126-277
C315	126-279
C316	126-278
C318, C321	126-214
C319, C320	126-034
C322	126-108
C324, C337	128-572
C325	124-076
C328	126-215
C330	126-170
CRYSTAL	
Y301	C139-238-00
DIODES	
CR301	137-806
CR302, CR303, CR310, CR311	139-211
CR304, CR305, CR306, CR307	137-316
CR308, CR309	137-317
RESISTORS	
R301, R309, R317, R337	112-101
R302	112-966
R303, R342	112-950
R304, R316, R325, R348, R349,	112-949
R351, R352	
TRANSISTORS	
Q301, Q302, Q303, Q304, Q305, Q311, Q315, Q316	B130-187
Q306, Q307, Q310, Q313, Q314, Q317	B130-168
Q308, Q312	130-233
Q309	130-604

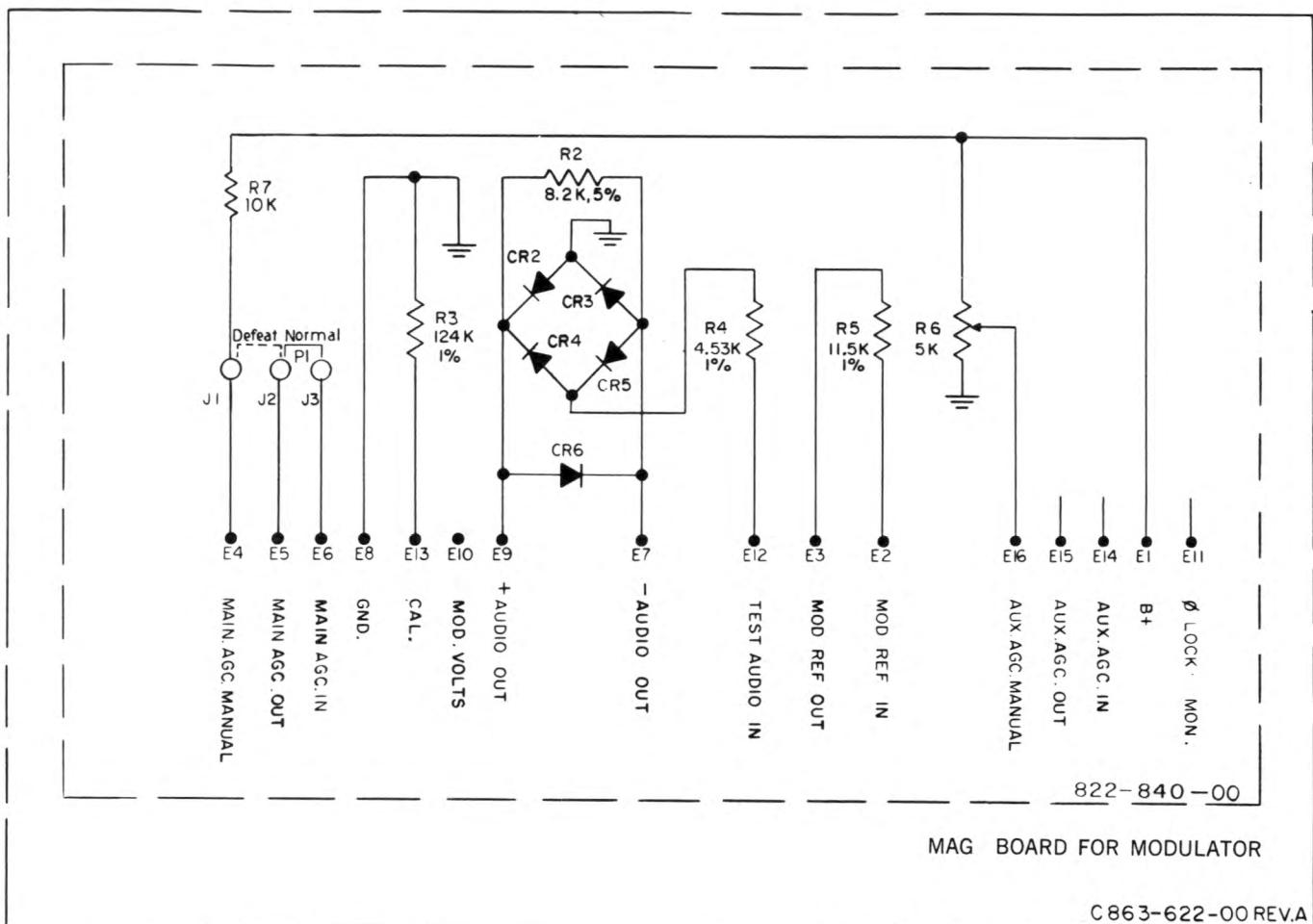
MODEL CVM	
ASSEMBLY No. 822-709-00	
DRAWING No. 863-519	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
R305	112-917
R306, R327	112-077
R307	113-111
R308	111-005
R310	S118-407-03
R311, R347	112-932
R312, R313	112-079
R314	112-975
R315, R323, R346	112-954
R318	112104
R319	S118-407-01
R320	112-083
R321, R331, R354	112-095
R322	112-096
R324	112-992
R326, R344, R353	111-015
R328	112-982
R329, R340, R345	112-086
R332, R336, R350	111-001
R333, R335, R338, R341	111-004
R334, R343	112-935
R339	112-919
R355	111-002
R356	112-093
R357	112-105
TRANSFORMERS	
T301	C144-766-00
T302	C144-766-01
T303	C144-766-02
T304, T305	C144-767-00
T306	C144-749
TRANSISTORS	
Q301, Q302, Q303, Q304, Q305, Q311, Q315, Q316	Q309 2N3903
Q306, Q307, Q310, Q313, Q314, Q317	Q310 2N3905
Q308, Q312	Q308 2N3905
Q309	Q311 MPS6547





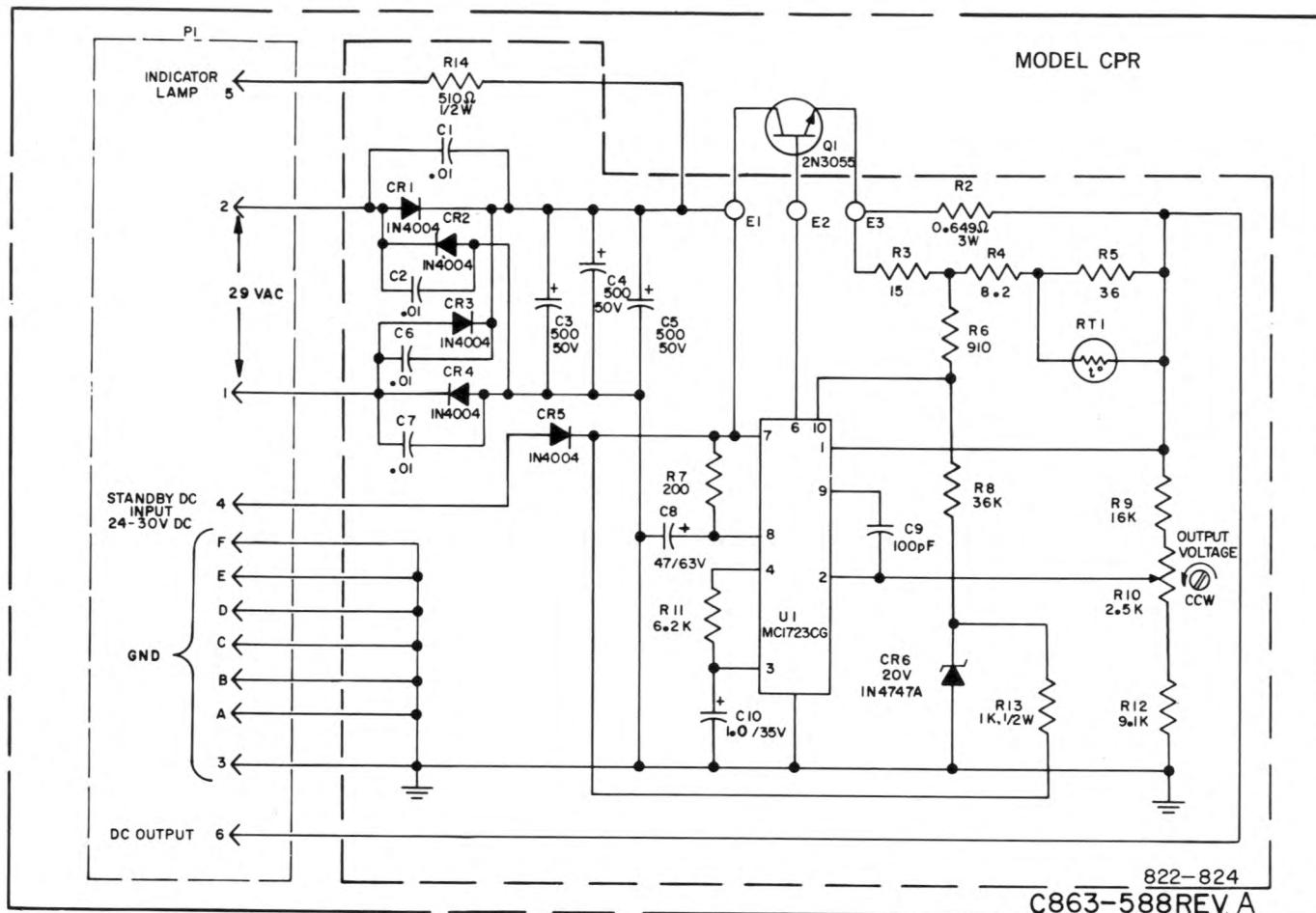
### REPLACEMENT PARTS LIST

MODEL CVF	
ASSEMBLY No. 822-707-00	
DRAWING No. 863-505	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
CAPACITORS	
C601	126-101
C602, C603, C606, C607, C609, C611, C613, C615, C620, C623	128-593-00
C604	126-102
C605, C616	126-098
C608, C618, C621	126-170
C610	126-097
C612	126-237-00
C614	126-167
C617	126-215
C619, C624	122-066
C622	126-236-00
RESISTOR	
R601	112-954
TRANSFORMER	
T601	B144-727-00



### REPLACEMENT PARTS LIST

MAG BOARD FOR MODULATOR	
ASSEMBLY No. 822-840-00	
DRAWING No. 863-622—Sheet 1	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
DIODES CR2, CR3, CR4, CR5 CR6	139-210 139-169
JUMPER P1	184-103-00
RESISTORS R2 R3 R4 R5 R6 R	111-002 115-320-00 115-318-00 115-319-00 118-254-00 112-949



NOTES:

UNLESS OTHERWISE SPECIFIED.

1 - ALL RESISTORS ARE IN OHMS

2 - ALL CAPACITORS ARE IN  $\mu$ F.

### REPLACEMENT PARTS LIST

MODEL CPR		MODEL CPR (Cont.)	
ASSEMBLY No. 822-824		ASSEMBLY No. 822-824	
DRAWING No. 863-588		DRAWING No. 863-588	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART NO.	SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART NO.
CAPACITORS C1, C2, C6, C7 C3, C4, C5 C8 C9 C10	124-076 124-164 S127-150 126-091 127-316	RESISTORS (Continued) R4 R5 R6 R7 R8 R9 R10 R11 R12 R13 R14	112-075 112-978 112-920 112-984 111-037 112-933 118-252 112-981 112-987 112-359 112-326
DIODES CR1, CR2, CR3, CR4, CR5 CR6	127-502 137-781	THERMISTOR RT1	110-026
INTEGRATED CIRCUIT U1	134-006	TRANSISTOR Q1	S130-146
RESISTORS R2 R3	113-229 112-973		

## REPLACEMENT PARTS LIST

MODEL ICC OSCILLATOR	
ASSEMBLY No. 822-726	
DRAWING No. 863-487	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERRROD PART No.
CAPACITORS	
C452, C453, C456, C457, C458, C463, C464, C466, C471, C473, C474, C475	124-077
C454, C455	127-079
C462	124-143-00
C468	128-230-00
C472	124-108-00
RESISTORS	
R451, R454, R463	112-977
R453	112-981
R455	112-096
R456	111-015
R458	111-006
R459, R461	112-974
R460	112-976
R462	112-077
R466, R467	112-929
TRANSFORMERS	
T451	C144-416-00
T452	C144-417-00
TRANSISTORS	
Q451	130-194
Q452, Q454, Q455	S130-607

<b>MODEL ICC OSCILLATOR, T7-T11</b>	
<b>ASSEMBLY No. 822-757</b>	
<b>DRAWING No. 863-487</b>	
<b>SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS</b>	<b>JERRLD PART NO.</b>
CAPACITORS	
9	124-079.
0	128-230-00
T-7	122-085
T-8	122-055
T-9	122-101
T-10	122-071
T-11	122-103
9, C470	128-568
STALS	
T-7	S139-279-40
T-8	S139-279-41
T-9	S139-279-42
T-10	S139-279-43
T-11	S139-279-44
ISTORS	
2	112-979
4, R465	112-992

DEL ICC OSCILLATOR, 2-6, 5*, 6*	
ASSEMBLY No. 822-741	
DRAWING No. 863-487	
CHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART NO.
CITORS	
2, 3	124-087-00
4, 5*	128-230-00
5, 6, 6*	122-091
C470	122-055
TALS	122-101
2	128-568
3	\$139-279-00
4	\$139-279-01
5	\$139-279-02
6	\$139-279-03
5*	\$139-270-04
6*	\$139-279-38
CTORS	\$139-279-39
R465	112-979
	112-992

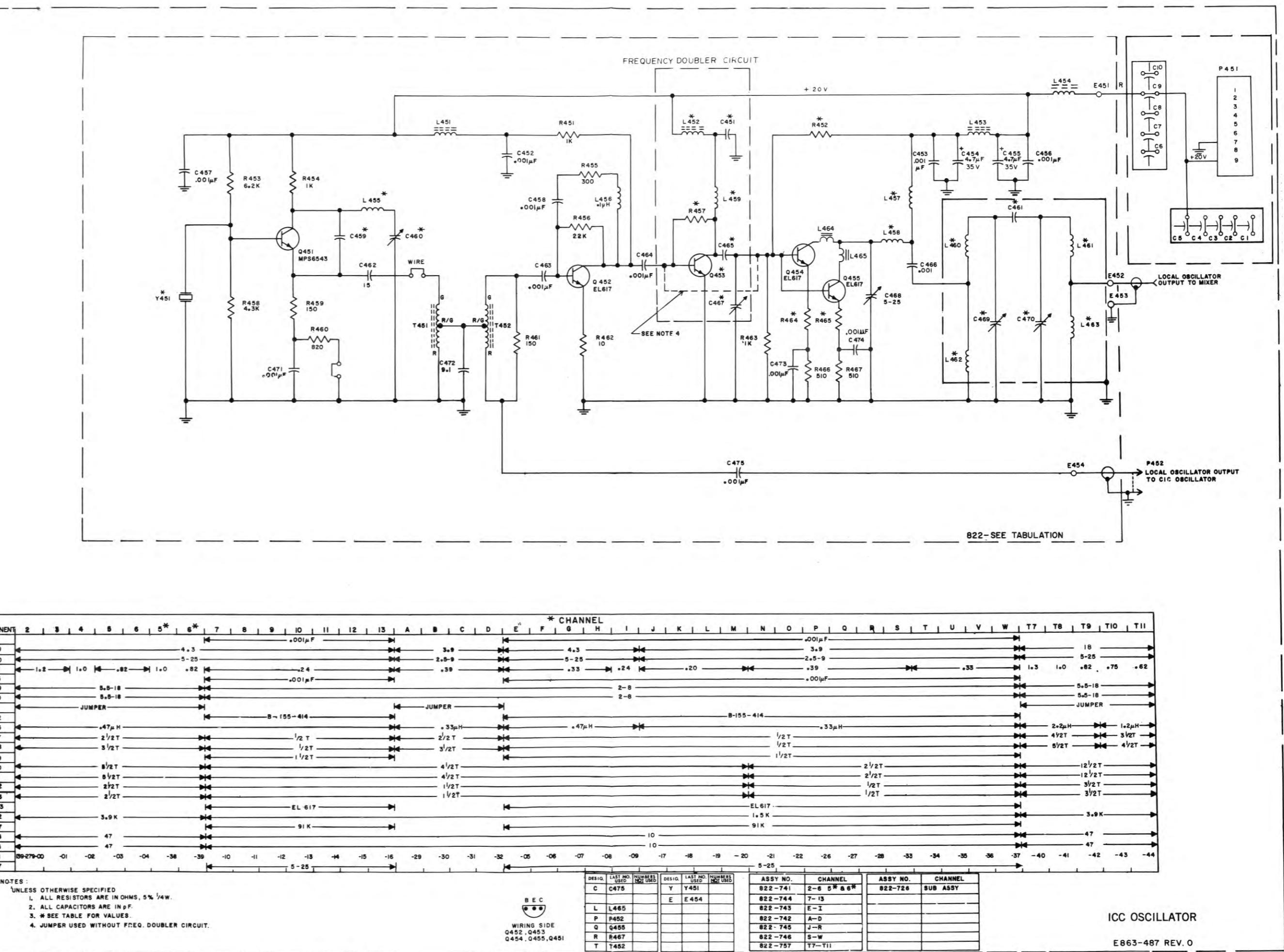
MODEL ICC OSCILLATOR, E-I	
ASSEMBLY No. 822-743	
DRAWING No. 863-487	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART NO.
CITORS	
C465	124-077
C467	124-087-00
C470	128-230-00
	122-082
TALS	128-546
E	S139-279-05
F	S139-279-06
G	S139-279-07
H	S139-279-08
I	S139-279-09
STORS	
R465	112-966
SISTOR	111-074
	112-077
	S130-607

<b>MODEL ICC OSCILLATOR, A-D</b>	
<b>ASSEMBLY No. 822-742</b>	
<b>DRAWING No. 863-487</b>	
<b>SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS</b>	<b>JERROLD PART No.</b>
CAPACITORS	
C459	112-059
C460	128-236-00
C461	122-089
C469, C470	128-546
CRYSTALS	
Y451-A	S139-279-29
Y451-B	S139-279-30
Y451-C	S139-279-31
Y451-D	S139-279-32
RESISTORS	
R452	112-966
R464, R465	112-077

PACITORS		
1, C465	124-077	128-230-00
9	124-087-00	122-082
0, C467	128-230-00	128-546
1	122-047	CRYSTALS
9, C470	128-546	Y451-E
YSTALS		Y451-F
1-7	\$139-270-10	Y451-G
1-8	\$139-279-11	Y451-H
1-9	\$139-279-12	Y451-I
1-10	\$139-279-13	RESISTORS
1-11	\$139-279-14	R452
1-12	\$139-279-15	R457
1-13	\$139-279-16	R464, R465
ISTORS		TRANSISTOR
2	112-966	Q453
7	111-074	
4, R465	112-077	\$130-607
ANSTITOR		
3	S130-607	
<b>MODEL ICC OSCILLATOR, J-R</b>		
ASSEMBLY No. 822-745		
DRAWING No. 863-487		
SCHEMATIC DESIGNATIONS		
JERROLD		

<b>MODEL ICC OSCILLATOR, S-W</b>	
<b>ASSEMBLY No. 822-746</b>	
<b>DRAWING No. 863-487</b>	
<b>SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS</b>	<b>JERROLD PART No.</b>
CAPACITORS	
C451, C465	124-077
C459	112-059
C460	129-236
C461-S	122-089
C461-T, U, V, W	122-082
C467	128-230
C469, C470	128-546
CRYSTALS	
Y451-S	S139-279-33
Y451-T	S139-279-34

MODEL ICC OSCILLATOR, S-W			
ASSEMBLY No. 822-746			
DRAWING No. 863-487			
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART NO.		
I-U	S139-279-35	C451, C465	124-077
I-V	S139-279-36	C459	122-059
I-W	S139-279-37	C460	128-236
ISTORS		C461	122-076
I2	112-966	C467	128-230
I7	111-074	C469, C470	128-546
I4, R465	112-077	CRYSTALS	
NSISTOR		Y451-J	S139-279-17
I3	S130-607	Y451-K	S139-279-18
		Y451-L	S139-279-19
		Y451-M	S139-279-20
		Y451-N	S139-279-21
		Y451-O	S139-279-22
		Y451-P	S139-279-26
		Y451-Q	S139-279-27
		Y451-R	S139-279-28
		RESISTORS	
		R452	112-966
		R457	111-074



# REPLACEMENT PARTS LIST

## MODEL ICCP OSCILLATOR

ASSEMBLY No. 822-733

DRAWING No. 863-494

Schematic Designations or Part Descriptions	Jerrold Part No.	Schematic Designations or Part Descriptions	Jerrold Part No.
CAPACITORS C451, C452, C453, C456, C457, C463, C464, C467, C468, C471, C472, C476, C478, C481, C482, C483, C485, C488, C489, C490, C493, C498, C499A, C499B, C499C, C499D C455, C458, C484	124-077	MIXER ML451	134-029-00
R451 R452, R454, R463, R466, R471, R476, R477, R478	112-981	RESISTORS R453	112-977
R457, R475	112-096	R458	111-015
R459, R474	112-994	R460	112-976
R461	112-974	R462, R482, R486	112-077
R467, R468, R479	112-929	R469, R472, R485	112-954
R470	112-966	R473	112-975
R480, R481, R484	112-849	R483	112-980
DIODE CR451	137-307	TRANSFORMERS T451	C144-417-00
INTEGRATED CIRCUIT U451	134-026-00	T452	C144-416-00
JUMPER P452	184-103-00	T453	B144-474
LED'S CR452, CR453	102-026-00	T454	B144-746
		T455	B144-745
		TRANSISTORS Q451, Q457 Q452, Q458 Q453, Q455, Q456, Q459	130-194 130-226 130-607

## MODEL ICCP OSCILLATOR, 2-6, 5\*, 6\*

ASSEMBLY No. 822-721

DRAWING No. 863-494

Schematic Designations or Part Descriptions	Jerrold Part No.	Schematic Designations or Part Descriptions	Jerrold Part No.
CAPACITORS C459-2, 3 C459-4, 5*, 6* C459-5, 6, 6*	122-091	CAPACITORS C454, C465	124-077
C460	122-055	C459	122-047
C462	122-101	C460	124-087
C463, C473, C474	128-230	C462, C466	128-230
C473, C474	128-568	C467, C474	128-546
C494-2, C495-2	124-079	C477-7, 8	122-104
C494-3, 4, 5, 5*	124-326	C477-9, 10	122-076
C495-3, 4, 5, 5*	124-326	C477-11, 12	122-079
CRYSTALS Y451-2	S139-279-00	C477-13	122-028
Y451-3	S139-279-01	Y451-7	S139-279-10
Y451-4	S139-279-02	Y451-8	S139-279-11
Y451-5	S139-279-03	Y451-9	S139-279-12
Y451-6	S139-279-04	Y451-10	S139-279-13
Y451-5*	S139-279-23	Y451-11	S139-279-14
Y451-6*	S139-279-39	Y451-12	S139-279-15
RESISTORS R455	111-074	Y451-13	S139-279-16
R456	112-966	RESISTORS R455	111-074
R464, R465	112-077	R464, R465	112-966
TRANSISTOR Q454	130-607	TRANSISTOR Q454	130-607

## MODEL ICCP OSCILLATOR, J-R

ASSEMBLY No. 822-731

DRAWING No. 863-494

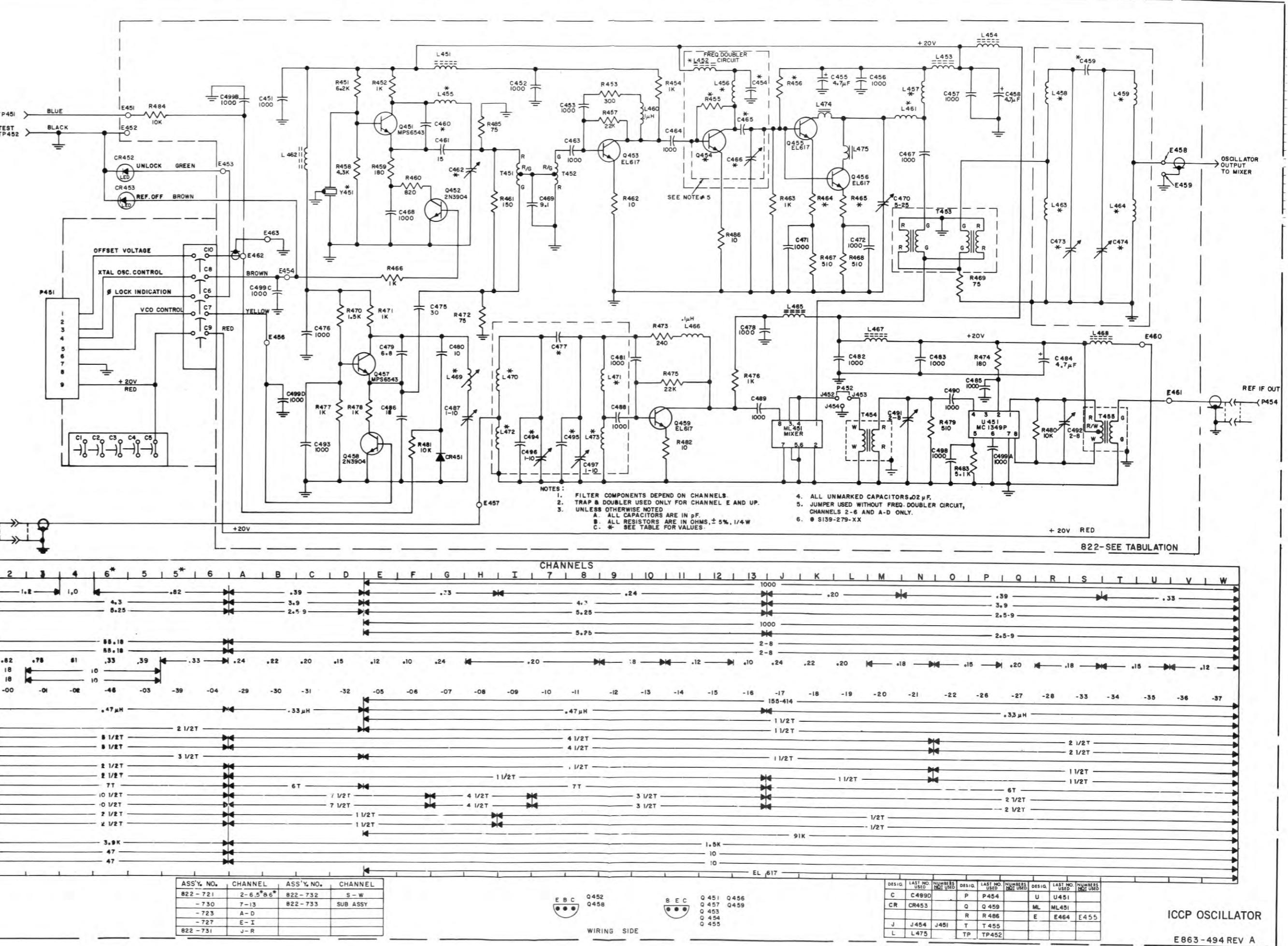
Schematic Designations or Part Descriptions	Jerrold Part No.	Schematic Designations or Part Descriptions	Jerrold Part No.
CAPACITORS C454	124-077	CRYSTALS (Cont.) Y451-L	S139-279-19
C459-I, K, L, M C459-N, O, P, Q, R	122-076	Y451-M	S139-279-20
C460	122-089	Y451-N	S139-279-21
C462, C466	124-086	Y451-O	S139-279-22
C473, C474	128-236	Y451-P	S139-279-26
C477-J	122-047	Y451-Q	S139-279-27
C477-L, Q	122-093	Y451-R	S139-279-28
C477-M, N, R	122-076	RESISTORS R455	111-074
C477-O, P	122-079	R456	112-966
CRYSTALS Y451-J	S139-279-17	R464, R465	112-077
Y451-K	S139-279-18	TRANSISTOR Q454	S130-607

## MODEL ICCP OSCILLATOR, A-D

ASSEMBLY No. 822-723

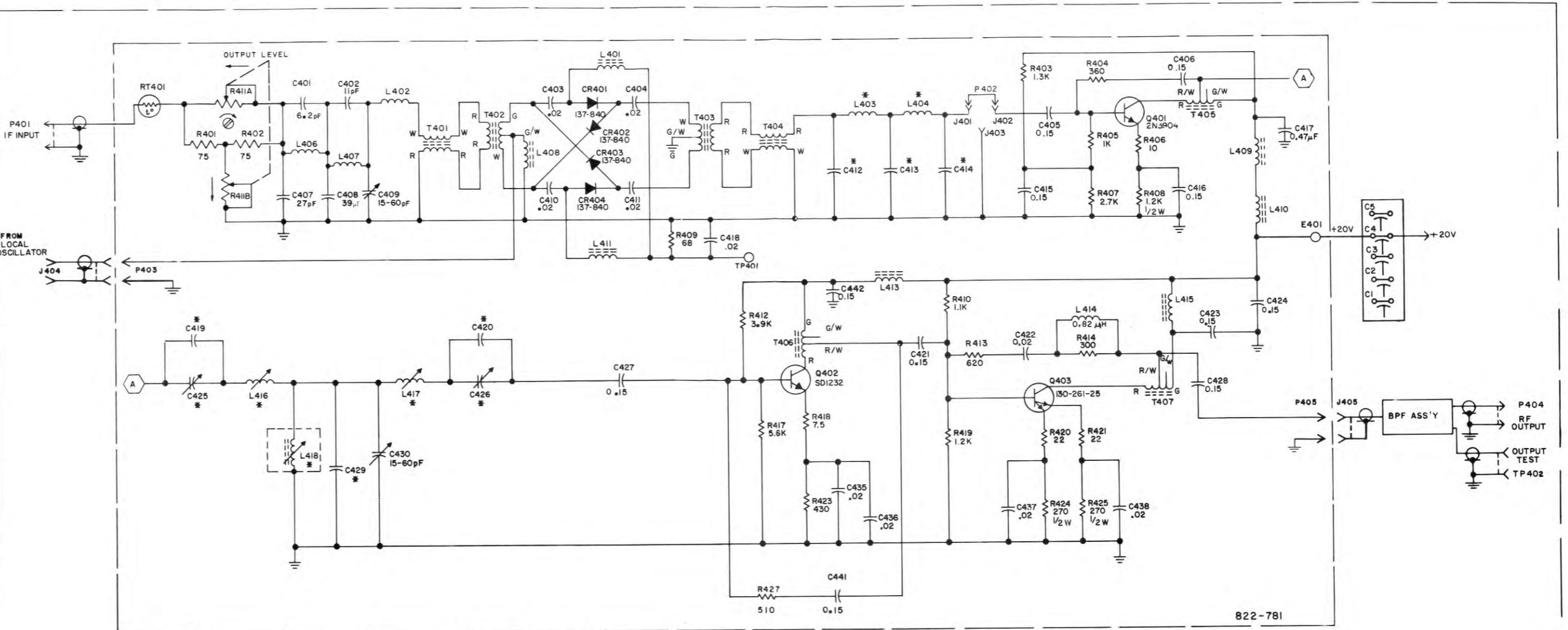
DRAWING No. 863-494

Schematic Designations or Part Descriptions	Jerrold Part No.
CAPACITORS C459	122-089
C460	124-086
C462	128-236-00
C473, C474	128-546
C477-A	122-047
C477-B	122-093
C477-C	122-076
C477-D	122-100
CRYSTALS Y451-A	S139-279-29
Y451-B	S139-279-30
Y451-C	S139-279-31
Y451-D	S139-279-32
RESISTORS R456	112-966
R464, R465	112-077



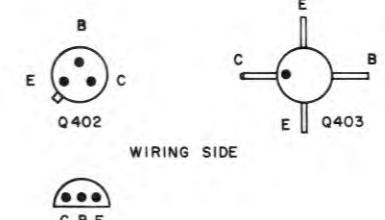
## REPLACEMENT PARTS LIST

MODEL ICC CONVERTER, T7-T11	
ASSEMBLY No. 822-871	
DRAWING No. 863-589	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERRLD PART No.
CAPACITORS	
C401	124-139
C402	124-048-00
C403, C404, C410, C411, C418,	124-078
C422, C435, C436, C437, C438	
C405, C406, C415, C416, C421,	120-152
C423, C424, C427, C428, C441,	
C442	
C407	124-120-00
C408	124-131
C409, C430	128-546
C412-T7	126-174
C412-T8	126-100
C412-T9	126-107
C412-T10	126-103
C412-T11	126-101
C413-T7	126-122
C413-T8	126-123
C413-T9	126-167
C413-T10	126-091
C413-T11	126-166
C414-T7	126-174
C414-T8	126-100
C414-T9	126-107
C414-T10	126-103
C414-T11	126-101
C417	124-066
C419-T7, C420-T7	126-122
C419-T8, C421-T8	126-107
C425-T7, T8, T9	128-546
C426-T7, T8, T9	128-546
C429-T7	126-114
C429-T8, T9, T10, T11	126-113
DIODES	
CR401, CR402, CR403, CR404	137-840
TRANSFORMERS	
T401, T404	B144-734
T402, T403	B144-735
T405, T406, T407	144-350
TRANSISTORS	
Q401	130-226
Q402	130-604
Q403	S130-261-25



DESIGN	LAST NO. USED	NUMBER OF PARTS
C	C442	548-549 C442-2442
CR	CR404	-
J	J405	-
L	L418	L408,418
P	P405	-
Q	Q403	-
R	R427	R419,4222
RT	RT401	-
T	T407	-
TP	TP402	-
E	E401	-

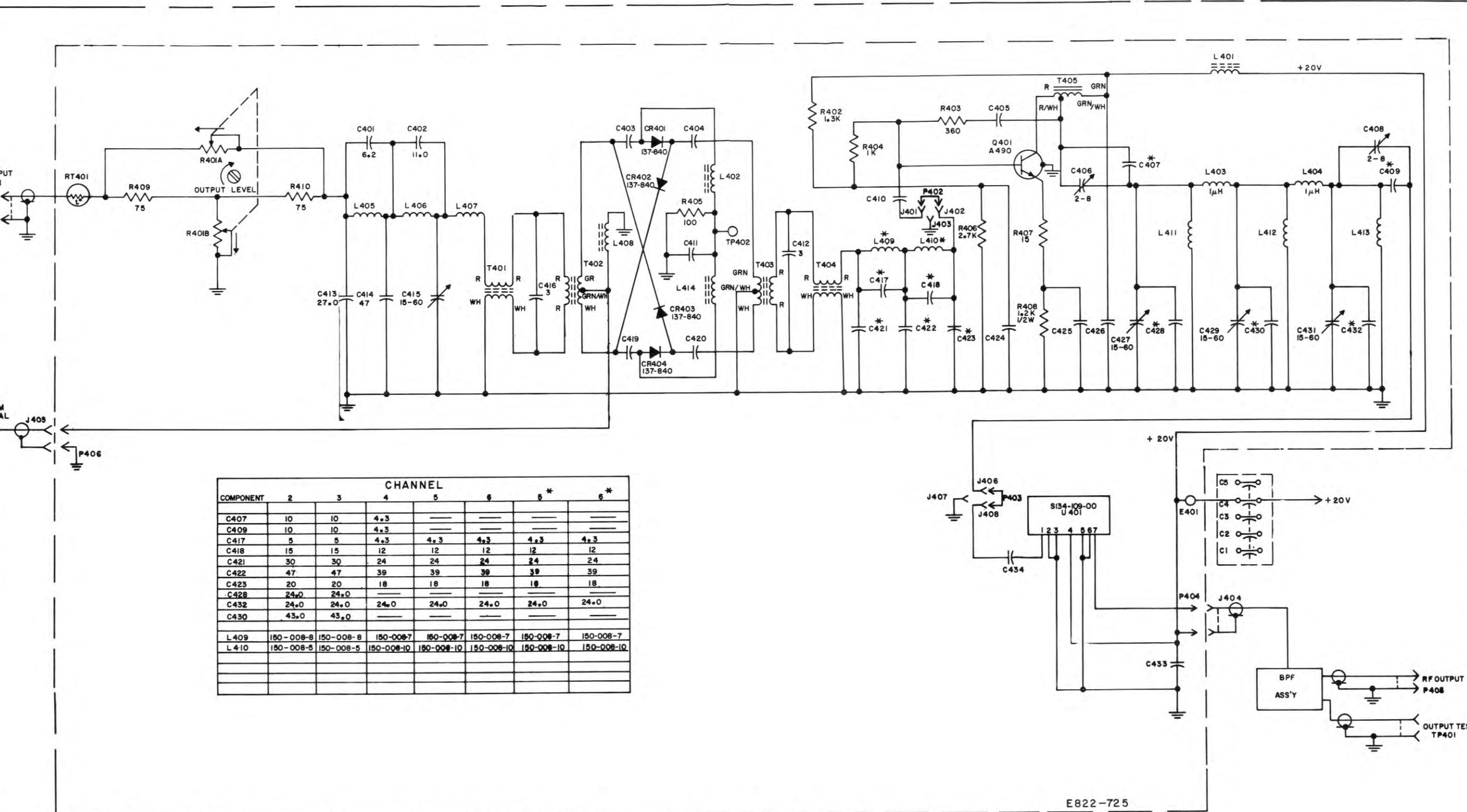
COMPONENT	CHANNEL				
	T7	T8	T9	T10	T11
C412	110 pF	75 pF	62 pF	50 pF	43 pF
C413	220 pF	160 pF	120 pF	100 pF	82 pF
C414	110 pF	75 pF	62 pF	50 pF	43 pF
C419	220 pF	62 pF	—	—	—
C420	220 pF	62 pF	—	—	—
C425	15-60 pF	15-60 pF	15-60 pF	9-35 pF	9-35 pF
C426	15-60 pF	15-60 pF	15-60 pF	9-35 pF	9-35 pF
C429	330 pF	300 pF	300 pF	300 pF	300 pF
L403	I9T	I5T	I2T	I1T	I0T
L404	I9T	I5T	I2T	I1T	I0T
L416	I55-636-00	I55-636-00	I55-636-00	I55-636-00	I55-636-00
L417	I55-636-00	I55-636-00	I55-636-00	I55-636-00	I55-636-00
L418	I55-635-00	I55-635-01	I55-635-02	I55-635-03	I55-638-00



ICC CONVERTER  
T7-T11  
E 863-589 REV. O

### REPLACEMENT PARTS LIST

MODEL ICC/ICCP CONVERTER, 2-6, 5* and 6*	
ASSEMBLY No. 822-725	DRAWING No. 863-486
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERRLD PART No.
<b>CAPACITORS</b>	
C401	124-139-00
C402	124-048-00
C403, C404, C405, C410, C411, C419, C420, C424, C425, C426, C433, C434	S124-078
C406, C408	128-546
C407, C409-2, 3	124-137-00
C407, C409-4	124-087-00
C412, C416	122-066
C413	124-120-00
C414	124-195
C415, C427, C429, C431	128-224
C417-2, 3	124-127
C417-4, 5, 6, 5*, 6*	124-087-00
C418-2, 3	124-143-00
C418-4, 5, 6, 5*, 6*	124-135-00
C421-2, 3	124-121-00
C421-4, 5, 6, 5*, 6*	124-176
C422-2, 3	124-122
C422-4, 5, 6, 5*, 6*	124-131
C423-2, 3	124-079-00
C423-4, 5, 6, 5*, 6*	124-188
C428-2, 3	126-188
C430-2, 3, 4, 5, 6, 5*, 6*	126-188
C432-2, 3	126-101
<b>DIODES</b>	
CR401, CR402, CR403, CR404	137-840
<b>INTEGRATED CIRCUITS</b>	
U401	S134-109-00
<b>RESISTORS</b>	
R401	S18-600
R402	112-064
R403	112-098
R404	112-977
R405	112-950
R406	112-931
R407	112-973
R408	112-371
R409, R410	112-954
<b>THERMISTOR</b>	
RT401	110-313-00
<b>TRANSISTOR</b>	
Q401	130-152-2

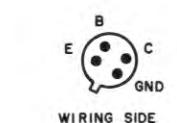


#### NOTES:

1. UNLESS OTHERWISE SPECIFIED:

- A. ALL RESISTORS ARE IN OHMS 5%, 1/4 W.
- B. ALL CAPACITORS ARE IN  $\mu$ F
- C. ALL UNMARKED CAPACITORS ARE 0.02  $\mu$ F

2. \* SEE CHART FOR VALUES

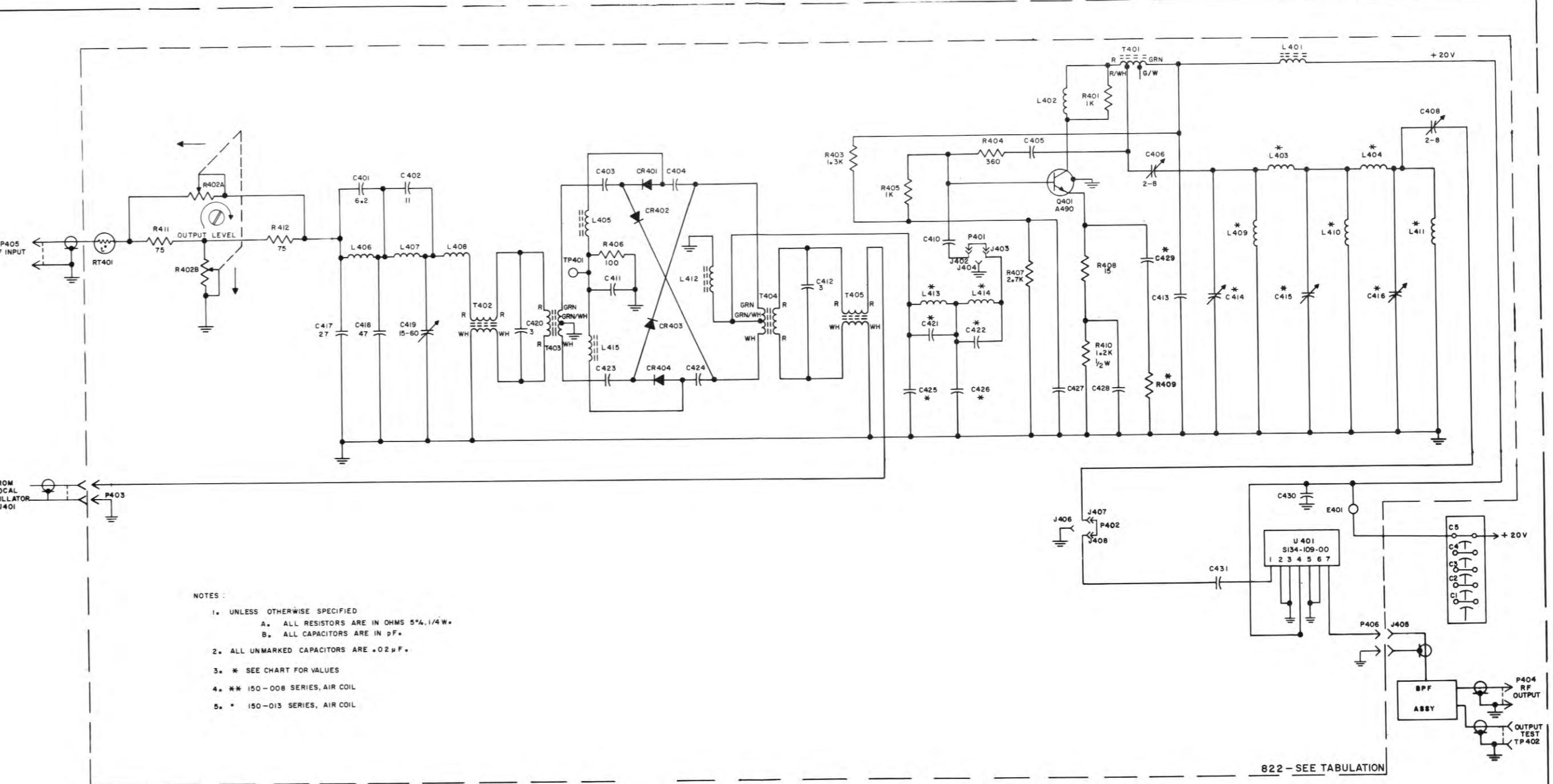


DESIG.	LAST NO. USED	NUMBERS NOT USED
C	C434	
CR	CR404	
E	E401	
T	T405	
TP	TP402	
L	L414	
P	P405	
Q	Q401	
R	R410	
RT	RT401	
J	J408	
U	U401	

## LACEMENT PARTS LIST

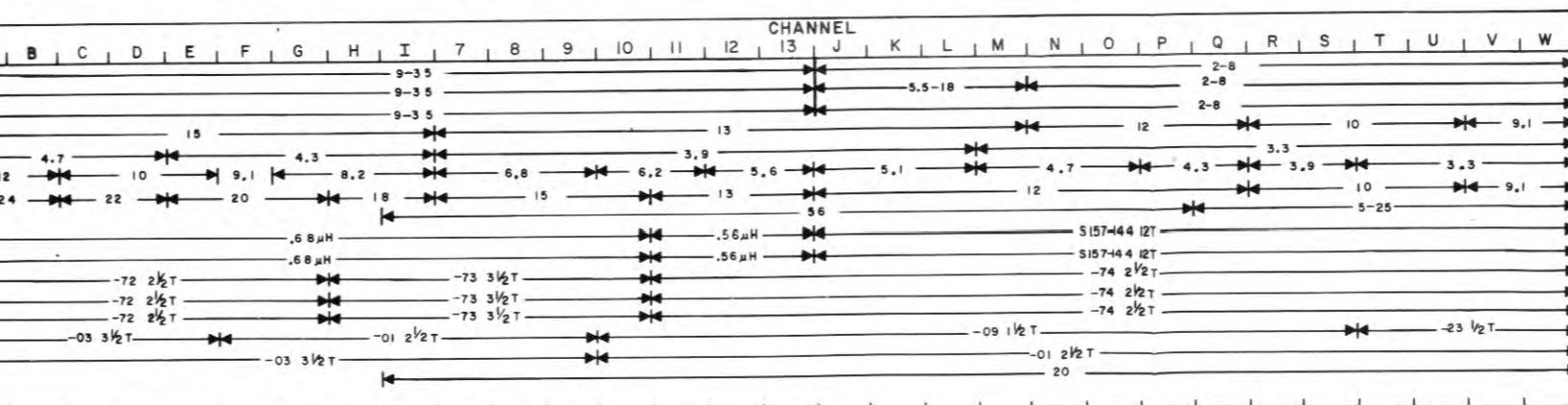
<b>MODEL ICC/ICCP CONVERTER, A-W, 7-13</b>	
<b>ASSEMBLY No. 822-724</b>	
<b>DRAWING No. 863-524</b>	
<b>SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS</b>	<b>JERROLD PART No.</b>
<b>CAPACITORS</b>	
401	124-139-00
402	124-048-00
403, C404, C405, C410, C411, 413, C423, C424, C427, C428, 430, C431	S124-078
406, C408	128-546
412, C420	122-066
417	124-120-00
418	124-195
419	128-224
<b>ODES</b>	
R401, CRR402, CR403, CR404	137-840
<b>TEGRATED CIRCUIT</b>	
401	S134-109-00
<b>IMPERS</b>	
401, P402	184-103-00
<b>ESISTORS</b>	
401, R405	112-977
402	S118-600
403	112-064
404	112-098
406	112-950
407	112-931
408	112-973
410	112-371
411, R412	112-954
<b>HERMISTOR</b>	
T401	110-313-00
<b>TRANSFORMERS</b>	
401	B144-350
402, T405	B144-734-00
403, T404	B144-735-00
<b>TRANSISTOR</b>	
401	S130-152-02

ODEL ICC/ICCP CONVERTER, A-I	
ASSEMBLY No. 822-737	
DRAWING No. 863-524	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERRLD PART No.
CACITORS	
4, C415, C416	128-565
1	124-143-00
2-A, B, C, D	124-061-00
2-E, F, G, H, I	124-087-00
5-A, B	124-102-00
5-C, D, E	124-137-00
5-F	124-108-00
5-G, H, I	124-103-00
6-A, B	124-176
6-C, D	124-105-00
6-E, F, G	124-119-00
6-H, I	124-079-00
9-I	124-162
STOR	
9-I	112-083
ODEL ICC/ICCP CONVERTER, J-R	
ASSEMBLY No. 822-738	
DRAWING No. 863-524	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERRLD PART No.
CACITORS	
4, C416	128-546
5-J, K, L, M	128-566
5-N, O, P, Q, R	128-546
1-J, K, L, M	124-115-00
1-N, O, P, Q	124-135-00
1-R	124-137-00
2-J, K, L	124-086-00
2-M, N, O, P, Q, R	124-113-00
5-J, K, L	124-127-00
5-M, N, O	124-061-00
5-P, Q	124-087-00
5-R	124-086-00
6	124-135-00
9-J, K, L, M, N, O, P	124-162
9-Q, R	128-230-00
STOR	
9	112-083



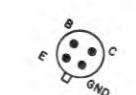
ES:

1. UNLESS OTHERWISE SPECIFIED
  - A. ALL RESISTORS ARE IN OHMS 5%, 1/4 W.
  - B. ALL CAPACITORS ARE IN pF.
2. ALL UNMARKED CAPACITORS ARE .02  $\mu$ F.
3. \* SEE CHART FOR VALUES
4. \*\* 150-008 SERIES, AIR COIL
5. \* 150-013 SERIES, AIR COIL

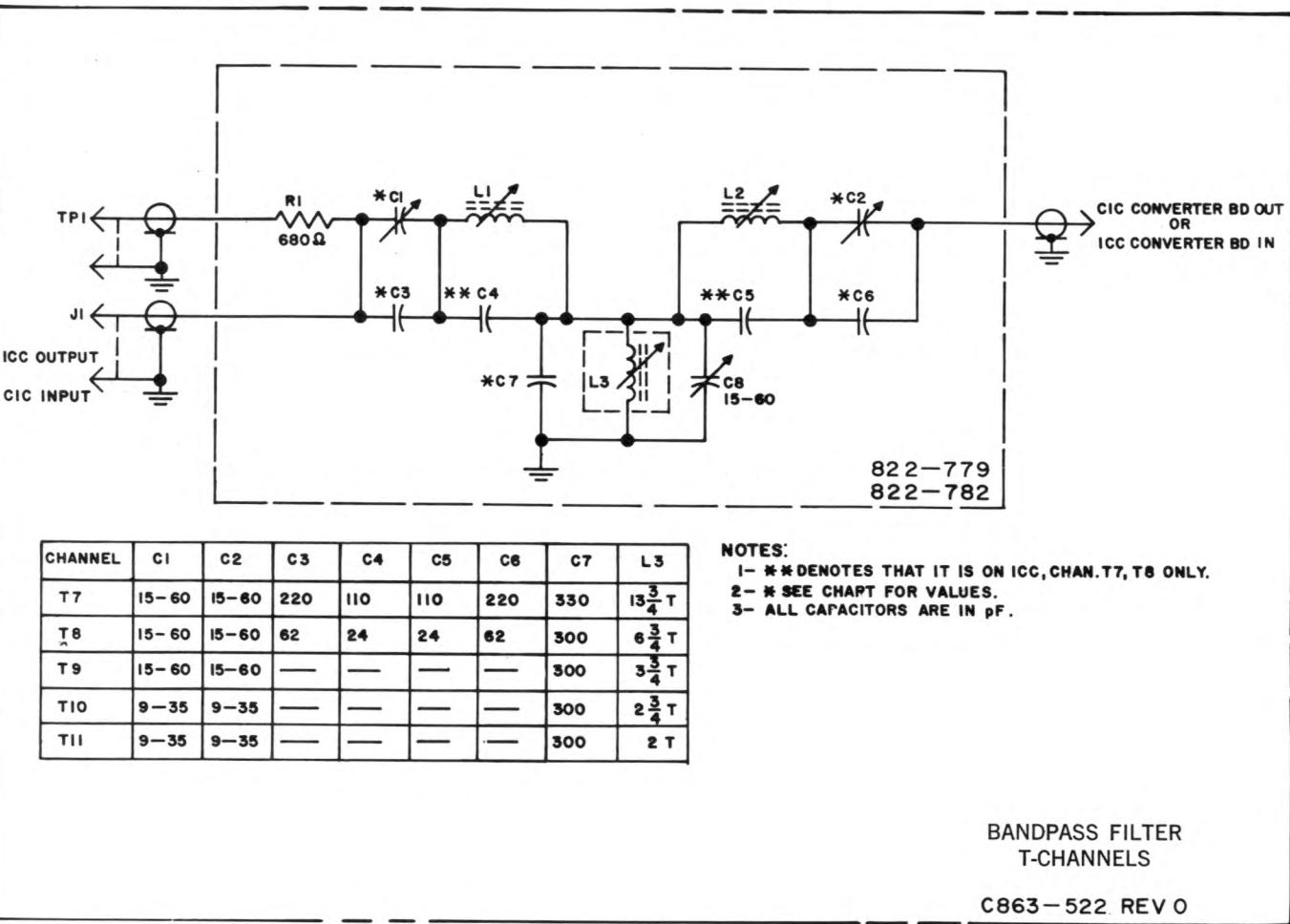


ASSY NO.	CHANNEL
822-724	SUB - ASS'Y
822-736	7-13
822-737	A - I
822-738	J - R
822-739	S - W

DESIGN	LAST NO USED	NUMBERS NOT USED	DESIGN	LAST NO USED	NUMBERS NOT USED
C	C431	407 409	RT	RT401	
CR	CR 404		T	T 405	
J	J410		U	U 401	
L	L415		TP	TP402	
P	P406		E	E 401	
Q	Q 401				
R	R 412				



CC/ICCP CONVERTER  
A-W, 7-13



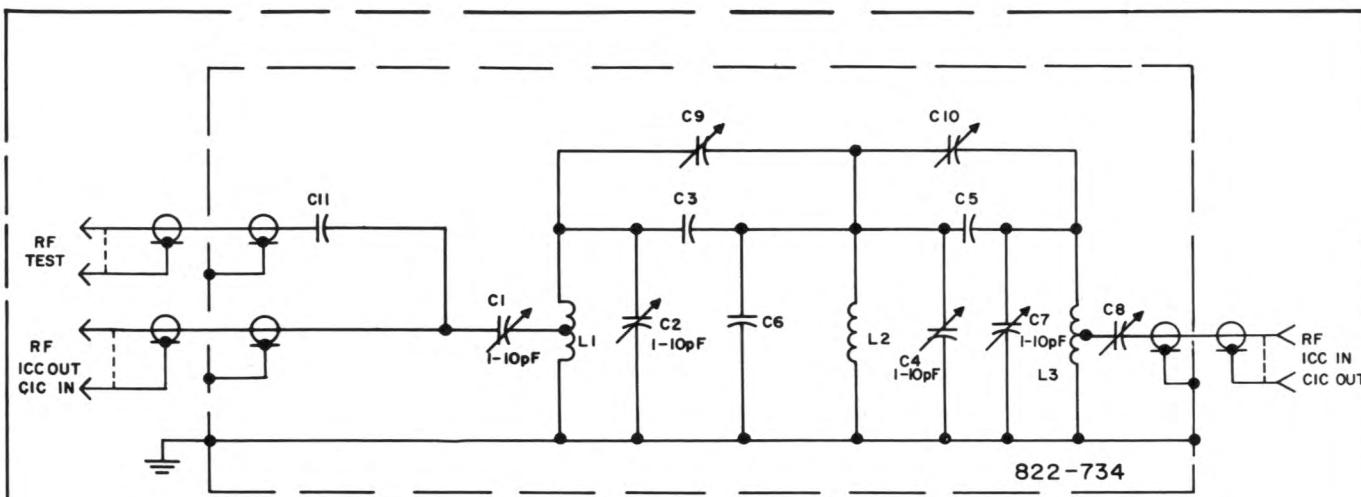
CHANNEL	C1	C2	C3	C4	C5	C6	C7	L3
T7	15-60	15-60	220	110	110	220	330	13 $\frac{3}{4}$ T
T8	15-60	15-60	62	24	24	62	300	6 $\frac{3}{4}$ T
T9	15-60	15-60	—	—	—	—	300	3 $\frac{3}{4}$ T
T10	9-35	9-35	—	—	—	—	300	2 $\frac{3}{4}$ T
T11	9-35	9-35	—	—	—	—	300	2 T

BANDPASS FILTER  
T-CHANNELS

C863-522 REV 0

### REPLACEMENT PARTS LIST

BANDPASS FILTER, T-CHANNELS		BANDPASS FILTER, T-CHANNELS	
ASSEMBLY No. 822-782		ASSEMBLY No. 822-782	
DRAWING No. 863-522		DRAWING No. 863-522	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.	SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
CAPACITORS			
CIC-T7 C1, C2, C8	128-224	ICC-T7 C1, C2, C8	128-224
C3, C6	126-122	C3, C6	126-122
C7	126-114	C4, C5	126-174
CIC-T8 C1, C2, C8	128-224	C7	126-114
C3, C6	126-107	ICC-T8 C1, C2, C8	128-224
C7	126-113	C3, C6	126-107
CIC/ICC-T9 C1, C2, C8	126-224	C4, C5	126-188
C7	126-113	C7	126-113
CIC/ICC-T10 C1, C2	128-565	COIL ASSEMBLIES	
C7	126-113	L3-CIC-T7, ICC-T7	B155-635-00
C8	128-224	L3-CIC-T8, ICC-T8	B155-635-01
CIC/ICC-T11 C1, C2	128-565	L3-CIC/ICC-T9	B155-638-02
C7	126-113	L3-CIC/ICC-T10	B155-635-03
C8	128-224	L3-CIC/ICC-T11	B155-638-00
		L1, L2 (all channels)	B155-636-00
		RESISTOR	
		R1	112-105



CHANNEL	C6	C3	C5	C11
2	4.7pF	1 pF	1 pF	3.9 pF
3	—	.75 pF	.75 pF	3.6 pF
4	—	.39 pF	.39 pF	3.3 pF
5	—	.24 pF	.24 pF	3.0 pF
6	—	.15 pF	.15 pF	2.7 pF
5*	—	.33 pF	.33 pF	3.0 pF
6**	—	.15 pF	.15 pF	3.0 pF

NOTES:

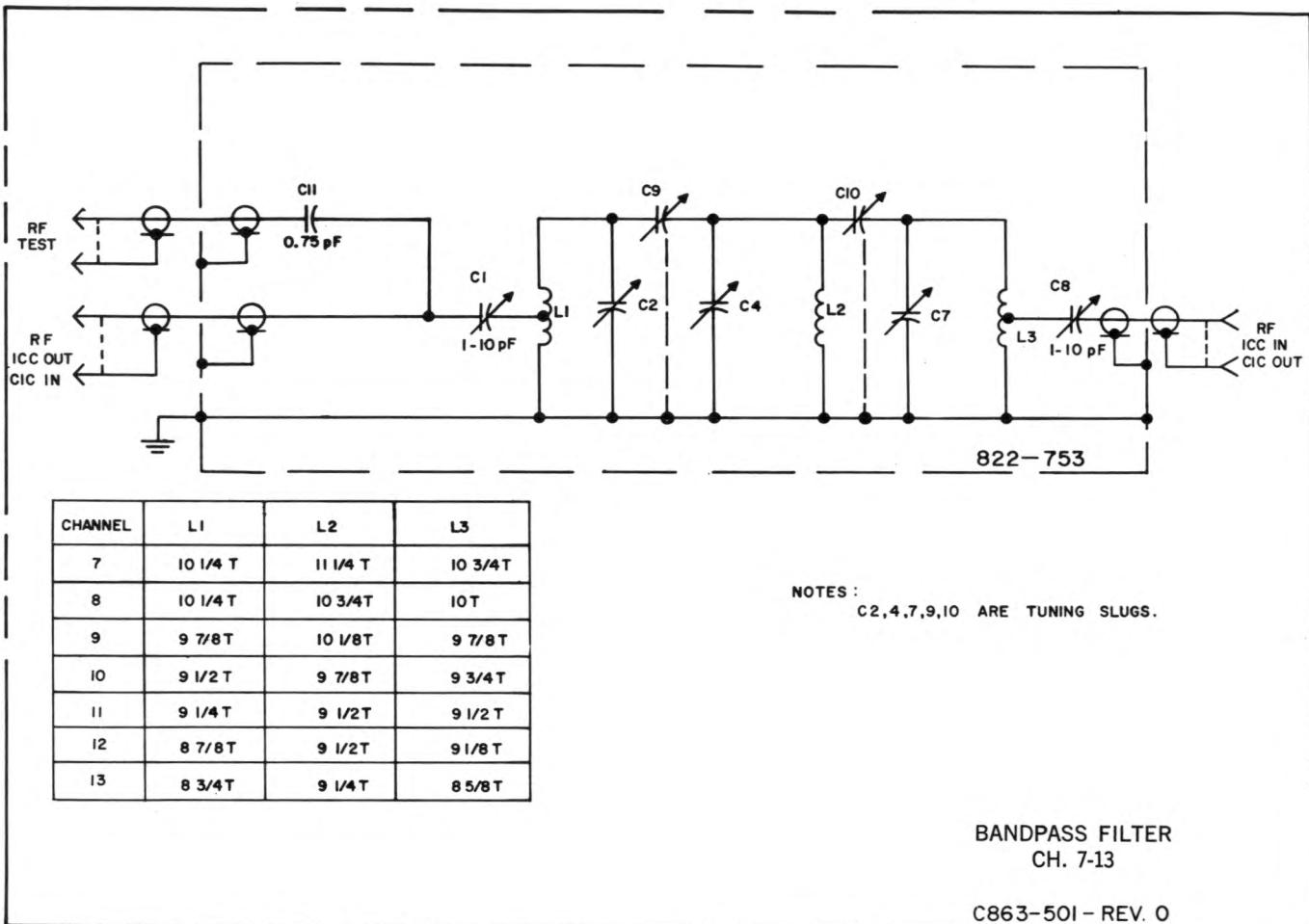
I. C9, C10 ARE TUNING SLUGS

BANDPASS FILTER  
CH. 2-6, 5\* AND 6\*

C863-502 REV A

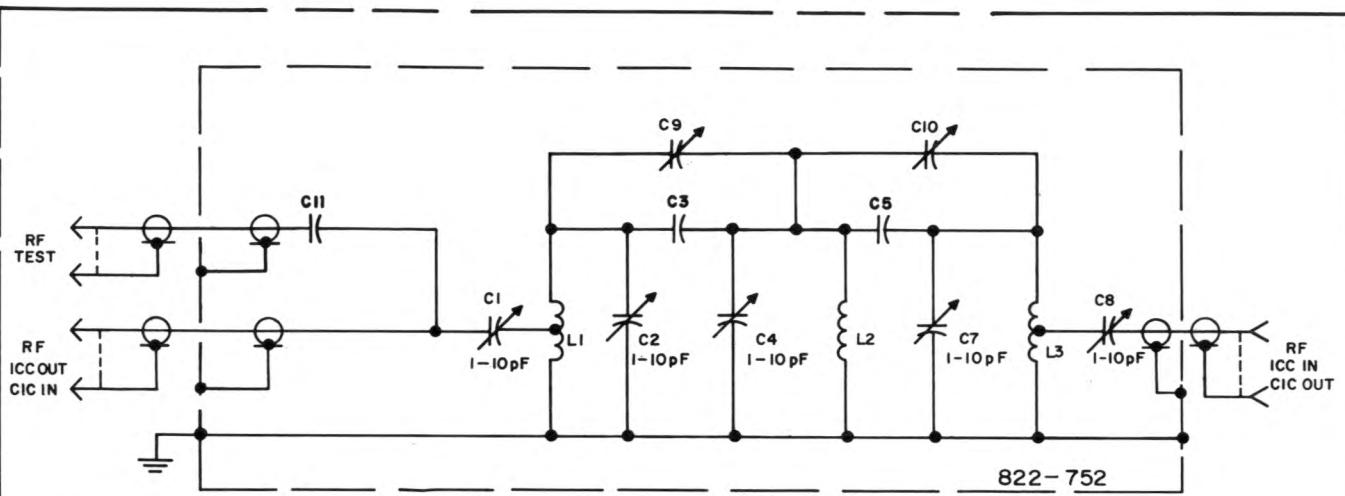
### REPLACEMENT PARTS LIST

BANDPASS FILTER, CH. 2-6, 5*, 6*	
ASSEMBLY No. 822-734	
DRAWING No. 863-502	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
CAPACITORS	
C1, C2, C4, C7, C8	128-590-00
C3, C5-2	122-055
C3, C5-3	122-071
C3, C5-4	122-089
C3, C5-5	122-047
C3, C5-6, 6*	122-100
C3, C5-5*	122-082
C6-2	124-061-00
C11-2	122-059
C11-3	122-068
C11-4	122-057
C11-5, 5*, 6*	122-066
C11-6	122-081
COIL ASSEMBLIES	
L1	D155-621-02
L2	D155-621-01
L3	D155-621-00
TUNING SLUGS	
C9, C10	716-145



### REPLACEMENT PARTS LIST

BANDPASS FILTER, CH. 7-13	
ASSEMBLY No. 822-753	
DRAWING No. 863-501	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERRROD PART No.
CAPACITORS C1, C8 C11	128-590-00 122-071
COIL ASSEMBLIES L1-7, 8 L2-7 L3-7 L2-8 L3-8 L1-9 L2-9 L3-9 L1-10 L2-10 L3-10 L1-11 L2-11, 12 L3-11 L1-12 L3-12 L1-13 L2-13 L3-13	D155-621-08 D155-621-07 D155-621-06 D155-621-10 D155-621-09 D155-621-13 D155-621-01 D155-621-21 D155-621-16 D155-621-15 D155-621-14 D155-621-19 D155-621-18 D155-621-17 D155-621-22 D155-621-12 D155-621-25 D155-621-24 D155-621-23
TUNING SLUGS C2, C4, C7, C9, C10	716-145



CHANNEL	C3	C5	L1	L2	L3	C11
A	0.010 pF	0.010 pF	6 1/8T	6 1/8T	6 1/8T	1.6
B	0.010 pF	0.010 pF	6 1/8T	6 1/8T	6 1/8T	1.5
C	GIMMICK	GIMMICK	6 1/8T	6 1/8T	6 1/8T	1.5
D	↑	↑	6 1/8T	6 1/8T	6 1/8T	1.3
E			6 1/8T	6 1/8T	6 1/8T	1.3
F			6 1/8T	6 1/8T	6 1/8T	1.3
G	GIMMICK	GIMMICK	6 1/8T	6 1/8T	6 1/8T	1.1
H	OMIT	OMIT	6 1/8T	6 1/8T	6 1/8T	1.1
I	OMIT	OMIT	6 1/8T	6 1/8T	6 1/8T	1.1

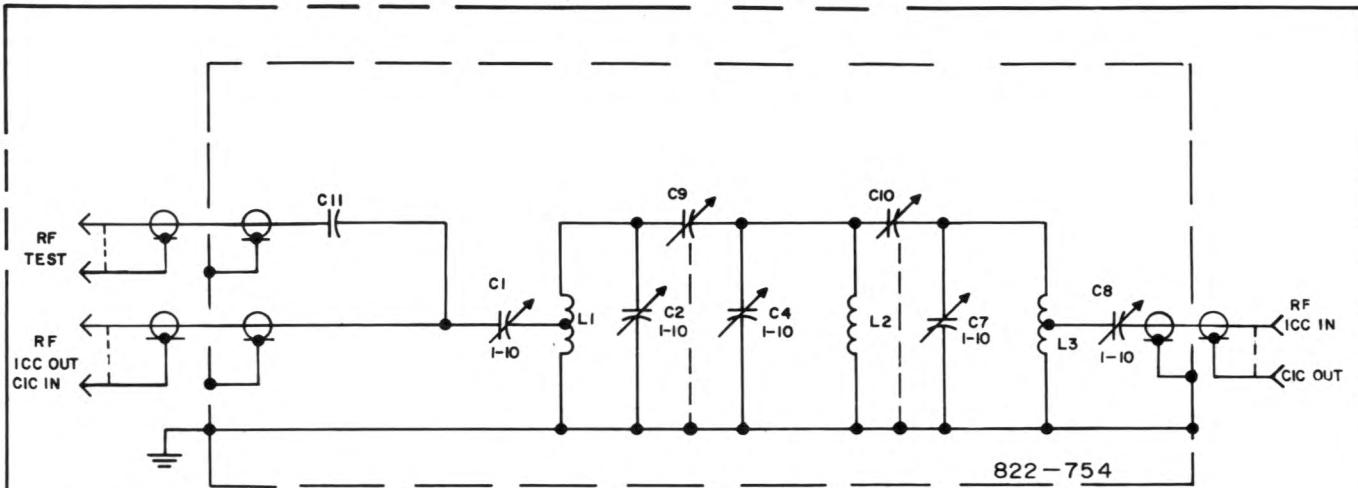
NOTES:  
C9 AND C10 ARE TUNING SLUGS

BANDPASS FILTER  
CH. A-I

C863-500 REV 0

### REPLACEMENT PARTS LIST

BANDPASS FILTER, CH. A-I	
ASSEMBLY No. 822-752	
DRAWING No. 863-500	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
CAPACITORS C1, C2, C4, C7, C8 C3-A, B; C5-A, B C11-A C11-B, C C11-D, E, F C11-G, H, I	128-590-00 122-028 122-098 122-056 122-085 122-088
COIL ASSEMBLIES L1 L2 L3	D155-621-05 D155-621-04 D155-621-03
TUNING SLUGS C9, C10	716-145



CHANNEL	L1	L2	L3	CII
J	8 1/8 T	8 3/4 T	8 1/4 T	0.56
K	7 3/4 T	8 3/4 T	8.0 T	0.56
L	7 1/2 T	8 1/4 T	7 3/4 T	0.56
M	7 3/8 T	8.0 T	7 1/2 T	0.56
N	7 1/8 T	7 3/4 T	7 1/4 T	0.56
O	7.0 T	7 1/2 T	7 1/4 T	0.39
P	6 3/4 T	7 1/2 T	7.0 T	0.39
Q	6 5/8 T	7 1/4 T	6 7/8 T	0.39
R	6 1/2 T	7.0 T	6 3/4 T	0.39

NOTES:

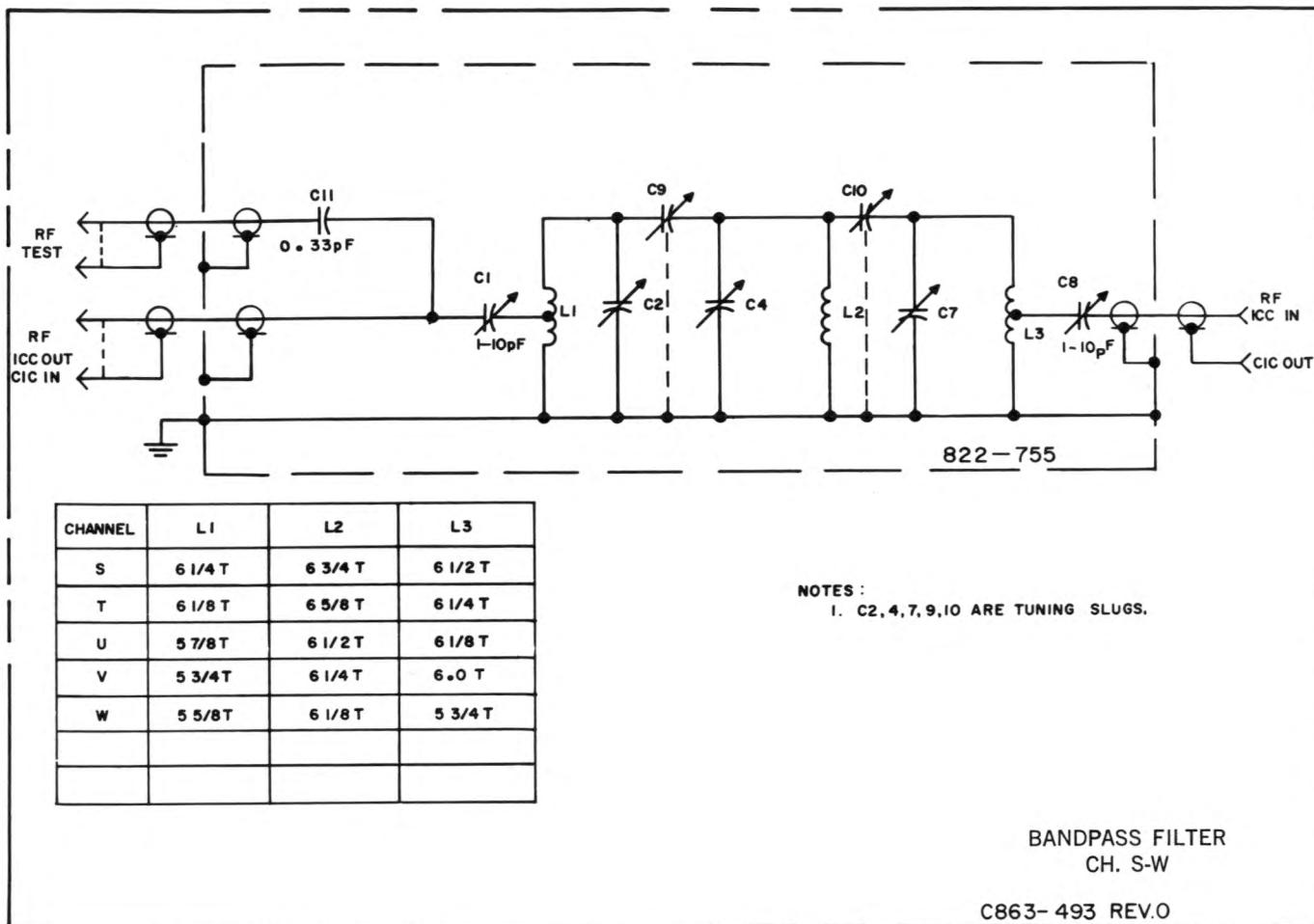
1. C2, 4, 7, 9, 10 ARE TUNING SLUGS
2. ALL CAPACITORS ARE IN FF UNLESS OTHERWISE SPECIFIED.

BANDPASS FILTER  
CHS. J to R

C863-492- REV. O

**REPLACEMENT PARTS LIST**

BANDPASS FILTER, CHS. J to R	
ASSEMBLY No. 822-754	
DRAWING No. 863-492	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
CAPACITORS	
C1, C8	128-590-00
C11-J, K, L, M, N	122-095
C11-O, P, Q, R	122-089
COIL ASSEMBLIES	
L1-J	D155-621-28
L2-J	D155-621-27
L3-J	D155-621-26
L1-K	D155-621-31
L2-K	D155-621-30
L3-K	D155-621-29
L1-L	D155-621-34
L2-L	D155-621-33
L3-L	D155-621-32
L1-M	D155-621-37
L2-M	D155-621-36
L3-M	D155-621-35
L1-N	D155-621-40
L2-N	D155-621-39
L3-N, O	D155-621-38
L1-O	D155-621-42
L2-O, P	D155-621-41
L1-P	D155-621-44
L3-P	D155-621-43
L1-Q	D155-621-47
L2-Q	D155-621-46
L3-Q	D155-621-45
L1-R	D155-621-50
L2-R	D155-621-49
L3-R	D155-621-48
TUNING SLUGS	
C2, C4, C7, C9, C10	716-145



CHANNEL	L1	L2	L3
S	6 1/4 T	6 3/4 T	6 1/2 T
T	6 1/8 T	6 5/8 T	6 1/4 T
U	5 7/8 T	6 1/2 T	6 1/8 T
V	5 3/4 T	6 1/4 T	6.0 T
W	5 5/8 T	6 1/8 T	5 3/4 T

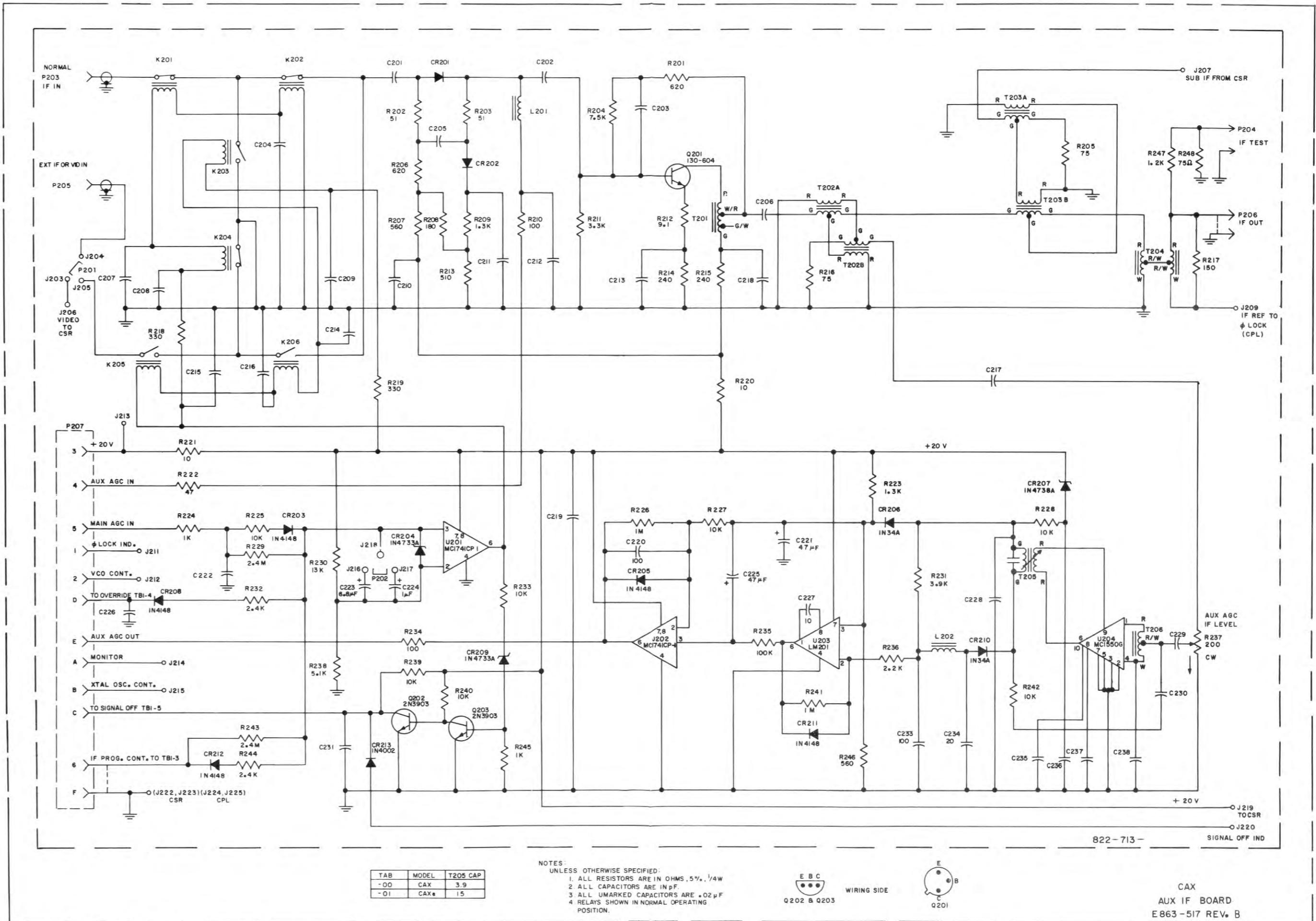
### REPLACEMENT PARTS LIST

BANDPASS FILTER, CH. S-W	
ASSEMBLY No. 822-755	
DRAWING No. 863-493	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
CAPACITORS C1, C8 C11	128-590-00 122-082
COIL ASSEMBLIES L1-S L2-S L3-S L1-T L2-T L3-T L1-U L2-U L3-U L1-V L2-V L3-V L1-W L2-W L3-W	D155-621-53 D155-621-52 D155-621-51 D155-621-67 D155-621-55 D155-621-54 D155-621-57 D155-621-56 D155-621-65 D155-621-60 D155-621-59 D155-621-58 D155-621-62 D155-621-66 D155-621-61
TUNING SLUGS C2, C4, C9, C10	716-145

## REPLACEMENT PARTS LIST

MODEL CAX	
ASSEMBLY No. 822-713-01	DRAWING No. 863-517
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
CAPACITORS C201, C202, C203, C204, C205, C206, C207, C208, C209, C210, C211, C212, C213, C214, C215, C216, C217, C218, C219, C222, C226, C228, C229, C230, C231, C235, C236, C237, C238 C220, C233 C221, C225 C223 C224 C227 C234	124-078 124-042 127-330-00 127-313 127-316 124-137 124-119
DIODES CR201, CR202 CR203, CR205, CR208, CR211, CR212 CR204, CR209 CR206, CR210 CR207 CR213	S137-309 137-824 137-805 139-261 137-808 137-686
INTEGRATED CIRCUITS U201, U202 U203 U204	134-506-00 134-516-00 130-223
JUMPERS P201, P202	184-103-00
RELAYS K201, K202, K203, K204, K205, K206	163-033-00
RESISTORS R201, R206 R202, R203	112-998 112-087

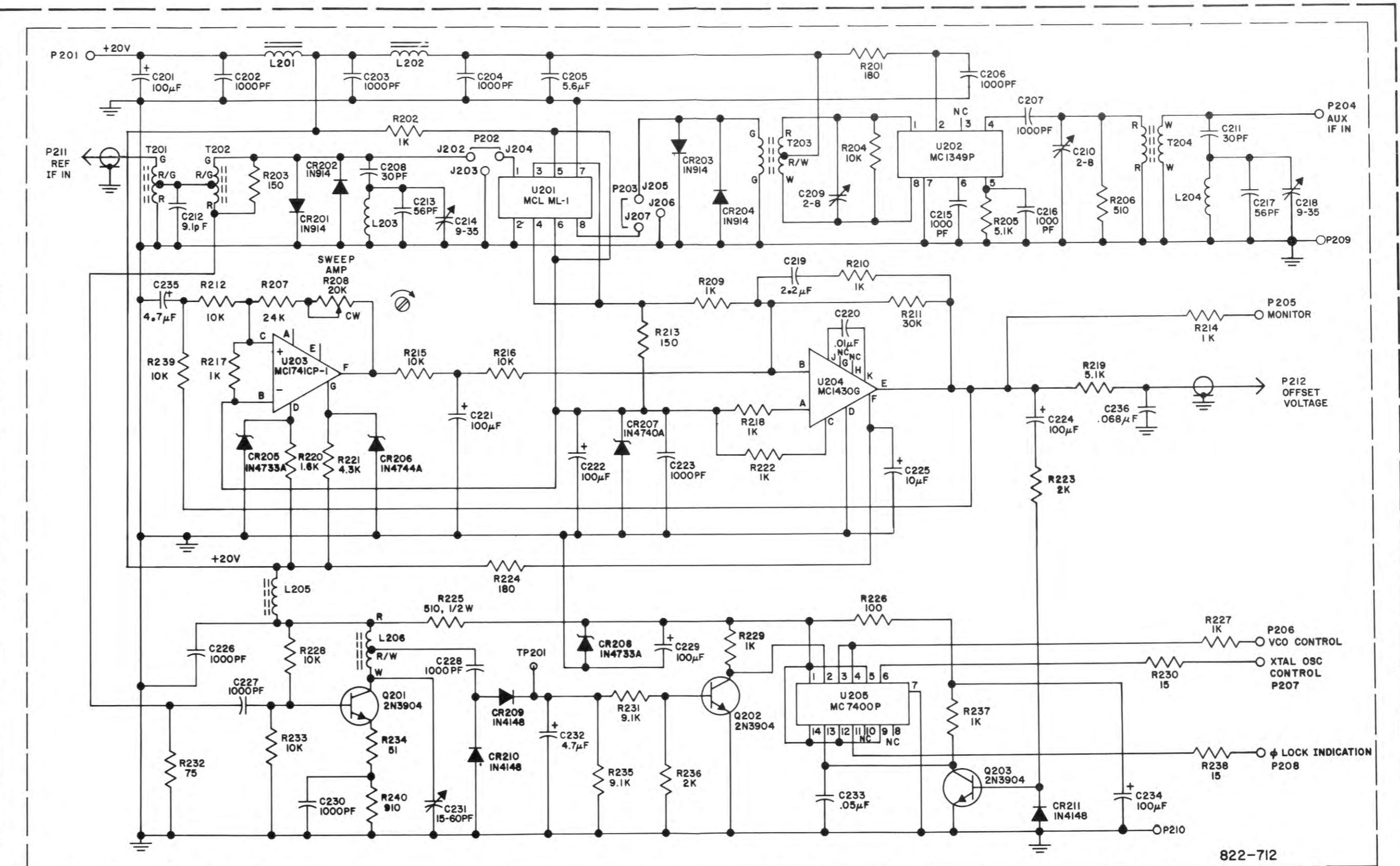
MODEL CAX (Cont.)	
ASSEMBLY No. 822-713-01	DRAWING No. 863-517
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
RESISTORS (Continued)	
R204 R205, R216, R248 R207, R246 R208 R209, R223 R210, R234 R211 R212 R213, R215 R217 R218, R219 R220, R221 R222 R224, R245 R225, R227, R228, R233, R239, R240, R242 R226, R241 R229, R243 R230 R231 R232, R244 R235 R236 R237 R238 R247	112-986 112-954 112-104 112-994 112-064 112-950 112-936 112-076 112-929 112-977 112-974 112-097 112-077 112-992 112-977 112-949 111-041 111-751 111-989 112-979 112-918 112-935 112-932 118-232 112-980 112-921
TRANSFORMERS T201 T202, T203 T204 T205 T206	B144-738 C144-467 C144-740 B155-622 B144-737
TRANSISTORS Q201 Q202, Q203	130-604 B130-187



### REPLACEMENT PARTS LIST

MODEL PLB	
ASSEMBLY No. 822-712	
DRAWING No. 863-521	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
CAPACITORS	
C201, C202, C203, C204, C206, C207, C215, C216, C223, C226, C227, C228, C230	S127-153
C205, C208, C211, C209, C210	124-077
C212	127-328
C213, C217, C214, C218	124-121-00
C219	128-546
C220, C221, C222, C224, C229, C234	124-108-00
C225	127-315-15
C231	127-064
C232, C235	128-224
C233	127-079
C236	124-150
DIODES	
CR201, CR202, CR203, CR204	139-169
CR205, CR208	137-805
CR206	137-761
CR207	137-722
CR209, CR210, CR211	137-824
INTEGRATED CIRCUITS	
U201	134-029-00
U202	134-026-00
U203	134-506
U204	134-028-00
U205	134-504
TRANSISTORS	
Q201, Q202, Q203	130-226

MODEL PLB	
ASSEMBLY No. 822-712	
DRAWING No. 863-521	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART No.
RESISTORS	
R201, R224	112-994
R202, R209, R210, R214, R217, R218, R222, R227, R229, R237	112-997
R203, R213	112-973
R204, R212, R215, R216, R228, R233, R239	112-949
R205, R219	112-980
R206	112-929
R207	112-963
R208	S118-407-07
R211	111-050
R220	111-012
R221	111-006
R223, R236	112-930
R225	112-326
R226	112-950
R230, R238	112-973
R231, R236	112-987
R232	112-954
R234	112-087
R240	112-920
TRANSFORMERS	
T201	C144-416-00
T202	C144-417-00
T203	B144-745
T204	B144-746
DIODES	
CR201, CR202, CR203, CR204	
CR205, CR208	
CR206	
CR207	
CR209, CR210, CR211	
INTEGRATED CIRCUITS	
U201	
U202	
U203	
U204	
U205	
TRANSISTORS	
Q201, Q202, Q203	130-226



DESIG.	LAST NO. USED	NUMBERS NOT USED	DESIG.	LAST NO. USED	NUMBERS NOT USED
C	C235		R	R240	
CR	CR211		T	T204	
J	J207		TP	TP201	
L	L206		U	U205	
P	P212				
Q	Q203				

#### NOTES:

- I. UNLESS OTHERWISE SPECIFIED
- A. ALL RESISTORS VALUES ARE IN OHMS, 1/4W, 5%.
- B. ALL CAPACITORS VALUES ARE IN PICO FARADS.

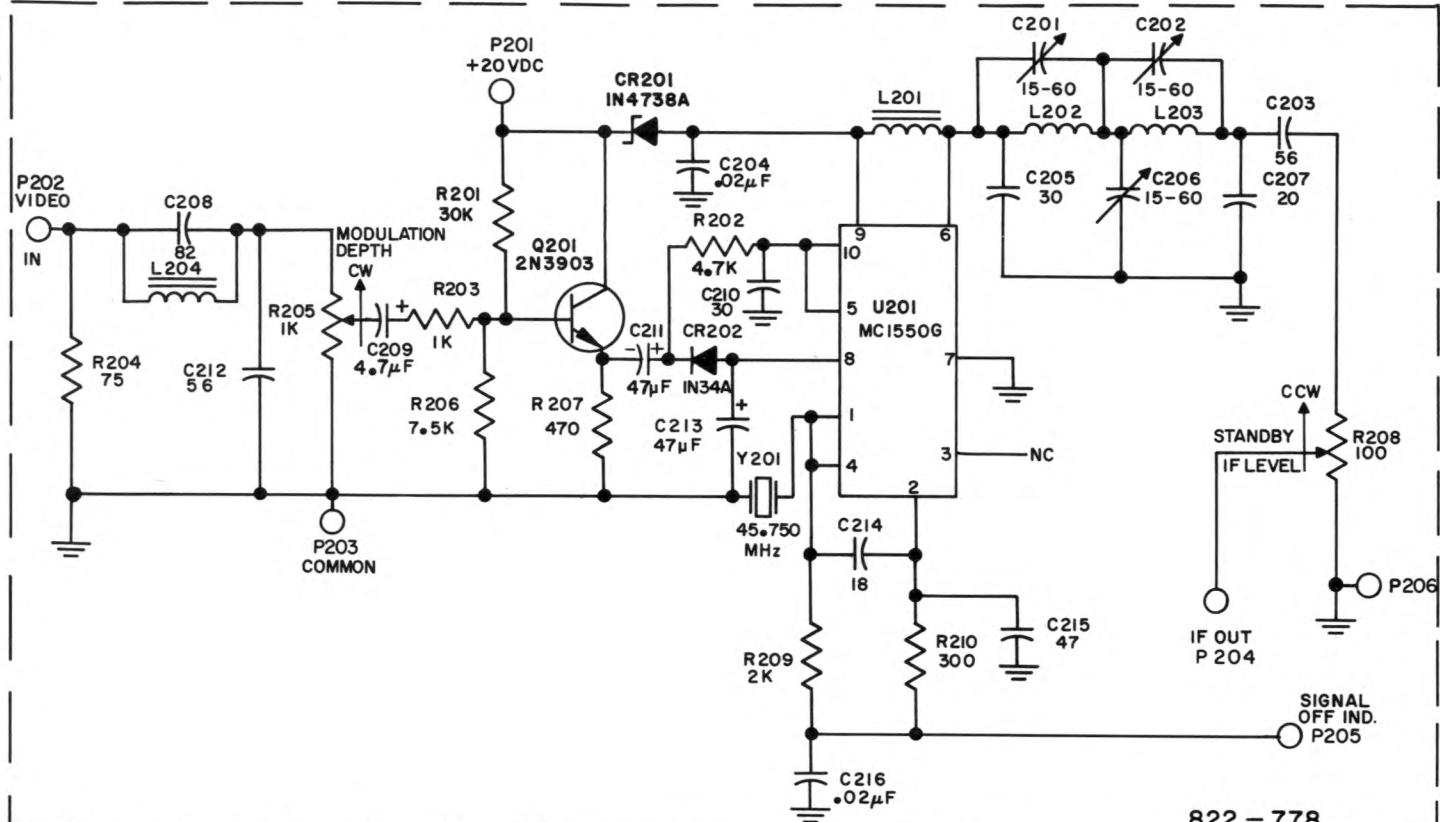


WIRING SIDE  
Q201, Q202 & Q203

PHASE LOCK BOARD

PLB

D863-521 REV.A



NOTES:

- I - UNLESS OTHERWISE SPECIFIED:  
A - ALL RESISTORS ARE IN OHMS, 5%, 1/4 W.  
B - ALL CAPACITORS ARE IN pF.

822-778

SCHEMATIC

CSR

CARRIER REPLACER/MOD



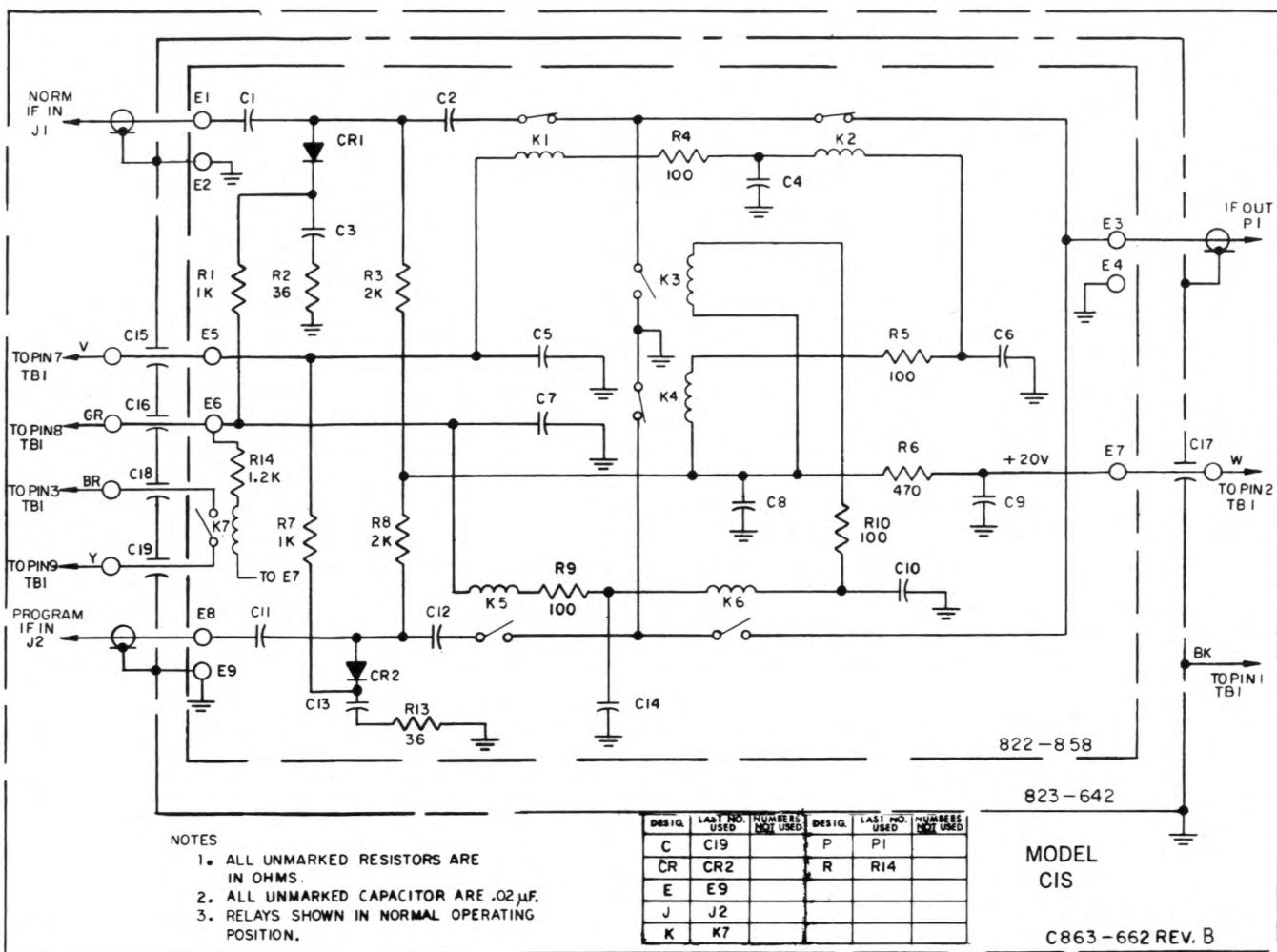
WIRING SIDE  
Q201

C863-590 REV. B

### REPLACEMENT PARTS LIST

CARRIER REPLACER/MOD.	
ASSEMBLY No. 822-778-00	
DRAWING No. 863-590	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART NO.
CAPACITORS	
C201, C202, C206	128-224
C203, C212	124-162
C204, C216	124-078
C205, C210	124-121-00
C207	124-119-00
C208	126-166
C209	127-079
C211, C213	127-330-00
C214	124-079-00
C215	124-122
CRYSTAL	
Y201	S139-279-45
DIODES	
CR201	137-808
CR202	139-261

CARRIER REPLACER/MOD.	
ASSEMBLY No. 822-778-00	
DRAWING No. 863-590	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART NO.
INTEGRATED CIRCUIT	
U201	130-223
RESISTORS	
R201	111-050
R202	111-001
R203	112-977
R204	112-954
R205	S118-401-01
R206	112-986
R207	111-662
R208	118-231
R209	112-930
R210	112-096
TRANSISTOR	
Q201	B130-187



### REPLACEMENT PARTS LIST

MODEL CIS	
ASSEMBLY No. 822-858	
DRAWING No. 863-662	
SCHEMATIC DESIGNATIONS OR PART DESCRIPTIONS	JERROLD PART NO.
CAPACITORS C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14 C15, C16, C17, C18, C19	128-078 129-200
DIODES CR1, CR2	S137-832
RELAYS K1, K2, K3, K4, K5, K6, K7	163-033
RESISTORS R1, R7 R2, R13 R3, R8 R4, R5, R9, R10 R6 R14	112-977 112-978 112-930 112-950 112-101 112-921